

The world survey grid, baseline Giza

Abstract

In this paper it is proven beyond reasonable doubt that the pyramids and structures on the Giza plateau to the west of Cairo contain a sophisticated prime meridian layout which is the baseline for a survey grid which tessellates continuously around the world. The geometric creation of that grid is explained and it is proven that other ancient monuments are built to align to the survey grid.

In the process of explaining the survey grid's design a series of locations on the Giza plateau are mathematically identified which correlate to the known surveying points of the plateau to within the tolerances of those surveys.

The coordinates of the corners of the Great Pyramid of Giza are located geometrically for the building's external stonework lines, the platform upon which it is built and for the external corners of the foundations of the building, known as the socket corners. From these corner points the azimuth of the casing sides of the pyramid are calculated and shown to agree to the surveyed value to within 0.63 of an arc second.

The boat pits that surround the Great Pyramid are resolved during the process of the analysis and are shown to contain the angular value of the tectonic plate movement of the African plate upon which the Giza plateau monuments are built. The discovery of an as yet unknown site in Egypt is explained which marks out the position of the sidereal day meridian relative to the prime meridian at Giza and it is shown that the external walls of the building at this location are a replica of the Sphinx temple's inner layout.

It is explained how the mastabas that surround the Giza pyramids have been designed to correlate to the geometric grid and the discovery is presented of the second Sphinx of Giza, which is situated to the south of the currently known statue and which is still buried under the desert sands. From this discovery the design of the Unfinished Pyramid at Zawiyet el-Aryan 3km south of Giza is deduced and the grid's dynamic grid rotation geometry is concluded at this location.

Finally it is shown how the grid tessellates around the world and that the principal row of statues on Easter Island at Ahu Tongariki align perfectly with the Giza grid design.

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The Great Pyramid papers

The world survey grid, baseline Giza

In the previous paper¹ in this series in which the apex plateau of the Great Pyramid was analysed, the relationship between the anchor point at the bottom of the building's underground shaft where it attaches to the Earth at sea level and the base center of the pyramid at ground level was established. The connection between these two points is shown in Diagram L1. The triangle that is formed using lines parallel to the cardinal axes as two of the sides of the triangle is shown inset within the diagram.

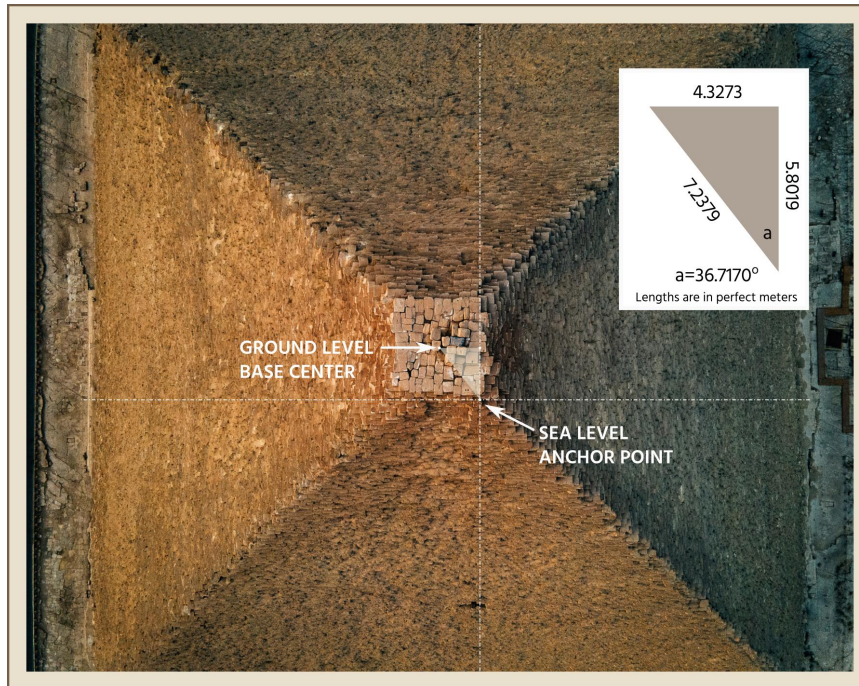


Diagram L1 - The relationship between the anchor point and the base center of the Great Pyramid.

The complex geometry puzzle that appears on the apex plateau of the Great Pyramid, which allows this triangle to be determined, was solved by using a modern day value for the duration of the orbital period of the Earth and therefore must contain some error arising from our ability to determine such values in the distant past. Later in this paper it can be shown that the hypotenuse of the triangle contains a length discrepancy of about 2.5 cm and the error in the angle of the triangle is about 0.2 deg. The reason that these errors can be determined is because this triangle defines a key part of the architects' surveying grid and a logical reconstruction of that grid produces a triangle intended to be identical to the one shown in the diagram and to which the apex triangle side lengths can be compared.

The formation of that survey grid can be broken down into a series of logical steps which are presented in this paper. So as not to confuse the reader with incorrect numerical information during the process of the explanation of the system, and because the adjustments during that process make changes to the numerical values often in the 6th or 7th decimal place, any numerical values that appear in this paper are final values that were determined once the analysis was complete.

Step 1

The first step in creating the original survey grid is to understand that the Giza Plateau has moved since the pyramids were built due to tectonic plate movement, and that latitude and longitude calculations on the system must be performed at their original values on the winter solstice of January 14th 2729 BCE. The first step is therefore to translate the Giza Plateau back to its original latitude position using the calculations of the tectonic plate movement from the previous paper in this series¹ and then to superimpose upon a satellite photograph of the area the latitude lines that are used in the survey grid, as shown in diagram L2.

JAN 14th 2729 BCE

0.5233 (rad)



0.52325 (rad)

0.5232 (rad)

0.52315 (rad)

0.5231 (rad)

0.52305 (rad)

0.5230 (rad)

0.52295 (rad)

0.5229 (rad)



Diagram L2 - The latitude lines of the Giza Plateau grid in 2729 BCE and , inset, the S.W. casing corner of the 3rd pyramid.

The latitude lines are measured in radians and are spaced 0.00005 radians apart and diagram L2 can be considered as the blank canvas upon which the whole of the Giza buildings are constructed. The satellite image is not required for the survey grid to be constructed and is shown on all diagrams in this paper for the purpose of allowing the grid's construction to be compared to the finished ground features.

As can be seen on diagram L2 the latitude line located at 0.5231 radians north passes through the S.W. casing corner of the third pyramid. The latitude of the marker point on the inset image was positioned using the relative locations of the Great Pyramid's base center point and that of the S.W. casing corner of the third pyramid taken from Petrie's table of surveying coordinates² and has been re-referenced to the 2018 GPS survey point of the Glen Dash team⁵ and the subsequent determination of the base center point of the Great Pyramid detailed in the previous paper¹.

The southern casing side of the 3rd pyramid was originally located at a latitude of 0.5231 radians and is the most important of any of the three pyramid's sides because of this fact. The tectonic plate movement in latitude of the Giza plateau can be determined from surveying this reference line.

Step 2

The second step, which can only be carried out once the Great Pyramid's architecture has been fully resolved, is to place the pyramid's anchor point (the point at the bottom of the underground shaft where the building connects to the Earth's reference ellipsoid at sea level) onto the drawing using the latitude of that point that is given³ in the pyramid's architecture of 0.5232237 rad. Diagram L3 shows the anchor point marked onto the drawing and given the name code 'GP1A'.

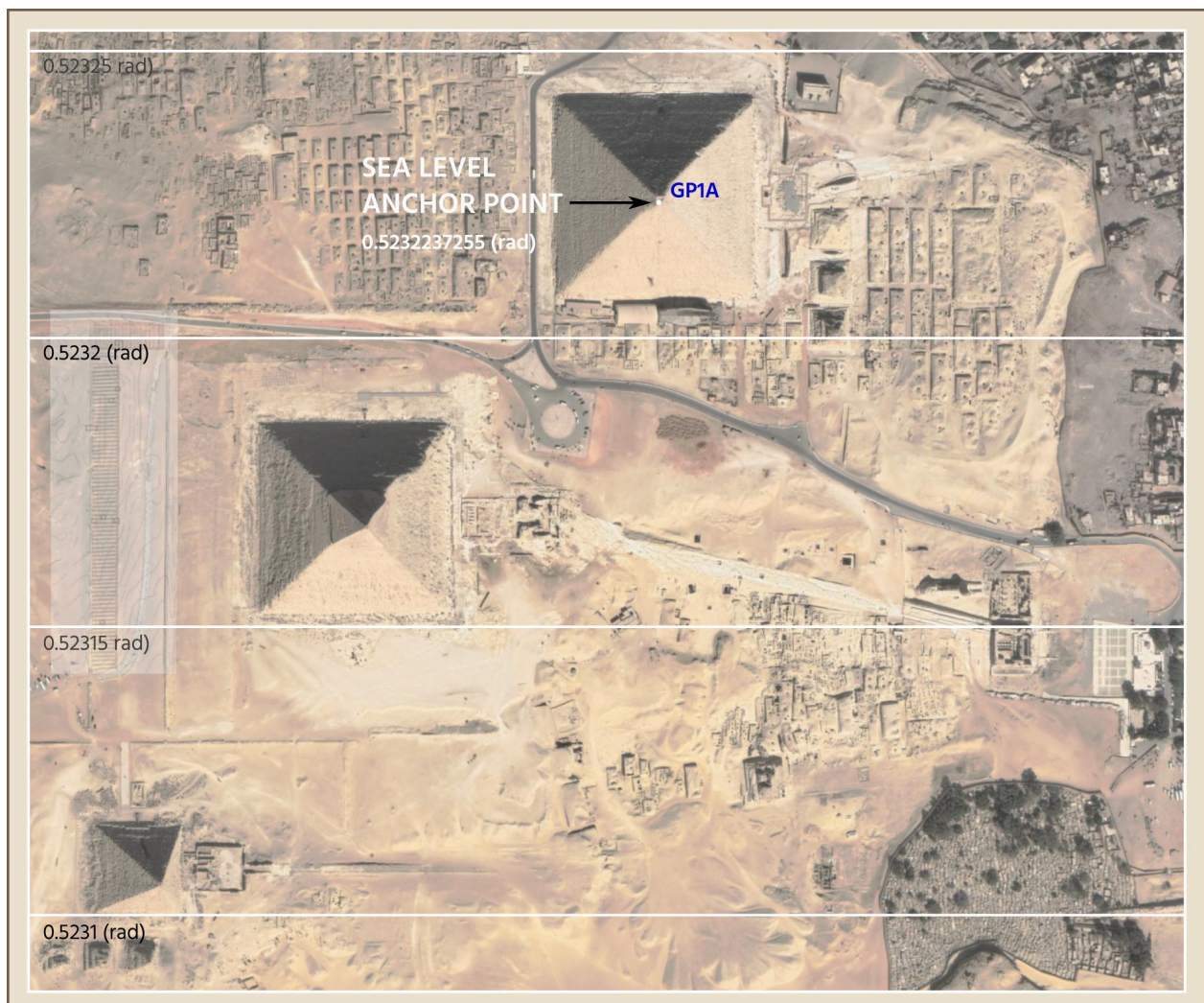


Diagram L3 - The placement of the Great Pyramid's anchor point on the grid.

Step 3

A line of 960 perfect meters length now needs to be drawn from the anchor point to the principal 0.5231 rad latitude line, the perfect meter being 1/40,000,000 of the Earth's polar circumference. This geometric construction needs to be carried out on a geodesic calculator using an unknown bearing and the known distance, and the bearing adjusted until the latitude of the point being created lies at exactly 0.5231 rad north. The bearing from north that is required is 144.92419 deg or 2.529404 rad and the resulting point is shown on diagram L4 situated a few meters to the south east of the Wall of the Crow and labeled "WOCA".

This seemingly arbitrary choice of line length is exactly that, and it is eliminated from the grid calculations in the final step of creating the grid system at the end of this paper.

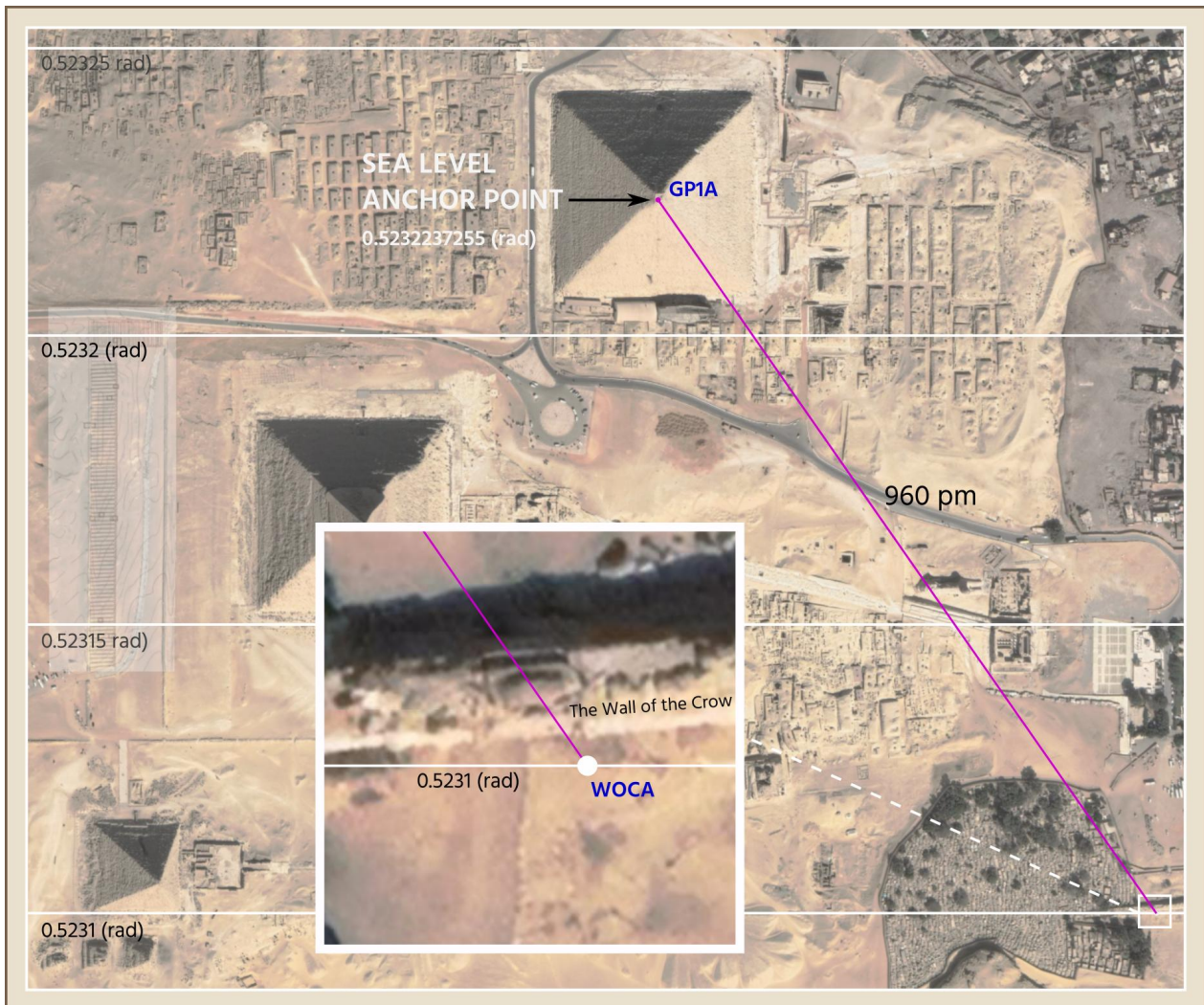


Diagram L4 - The 960 perfect meter line from the Great Pyramid to the Wall of the Crow.

Step 4

The next step is to determine the radius of the Earth's reference ellipsoid at the latitude of the point 'WOCA' using standard ellipse geometry, giving the radius as 6372779.85538089 pm. This value is then numerically transposed into a radian angle by dividing it by 10 million resulting in an angle of 0.63727 rad or 36.51333894793160 deg.

A line taken from the point 'WOCA' at this angle in a north north-west direction (a bearing of 323.486661052068 deg) passes through the N.W. casing corner of the Great Pyramid as shown in diagram L5.

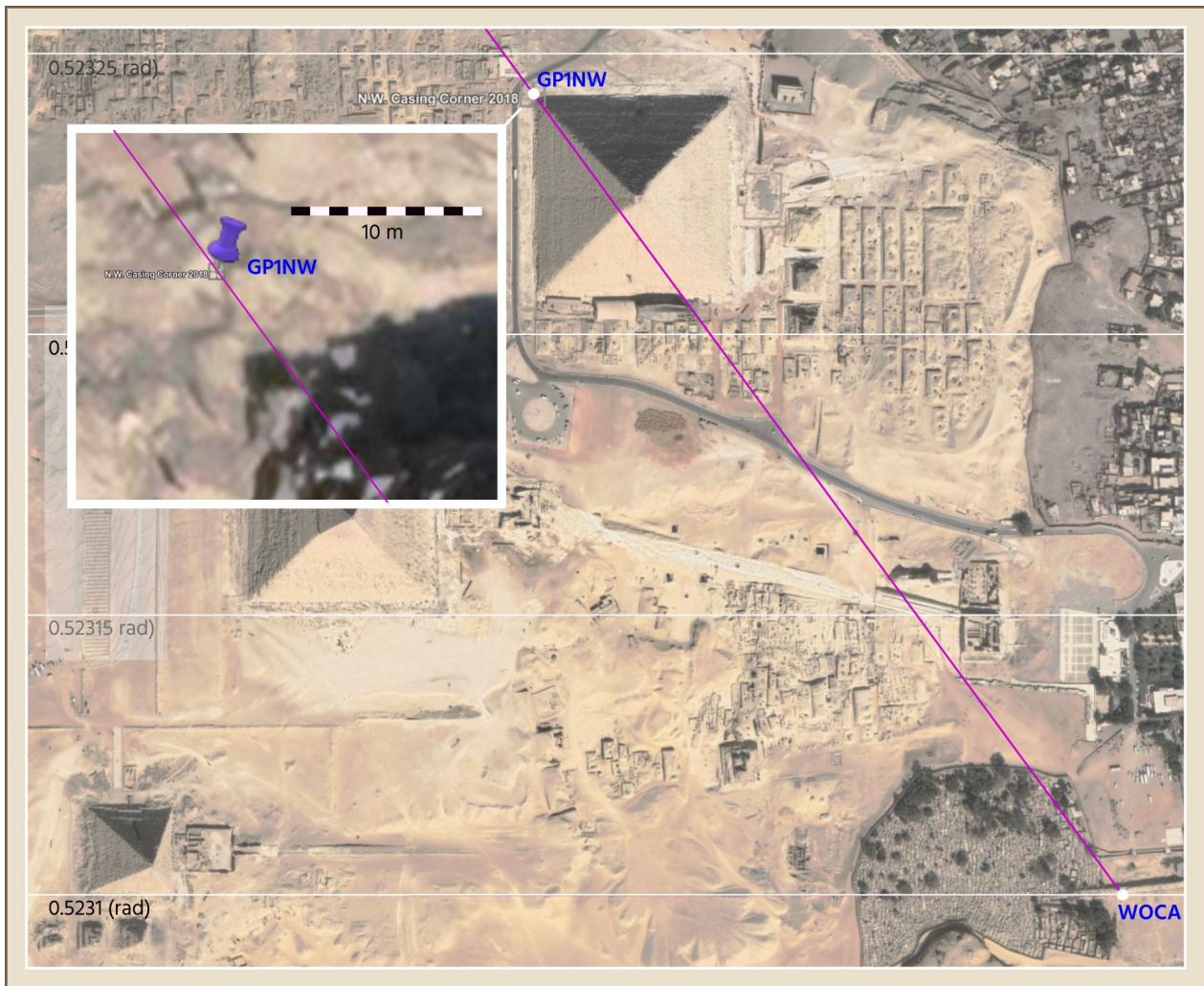


Diagram L5 - The radius-based line from the point 'WOCA' passing through the NW casing corner of the Great Pyramid.

On the inset image the N.W. casing corner point of the Great Pyramid is marked and on the main image is labeled using the name code 'GP1NW'. This point is taken from the 2015 Glen Dash survey of the pyramid, transposed onto the 2018 GPS datum by working out the difference in latitude and longitude between the base center point in 2018 calculated in the previous paper¹ and the base center point reported in the 2015 survey, and then using these two values to transpose the N.W. casing point. The same technique was applied to all the Glen Dash 2015 survey points that are shown in diagrams in this paper and all are marked clearly as 2018 values.

Step 5

The triangle that is formed between WOCA, GP1NW and the cardinal axes is intended to be identical in angles to the triangle formed on the apex plateau of the Great Pyramid, shown in diagram L1. The angular discrepancy between the two is due to the small calculation errors contained in the complex analysis of the apex plateau.

The side lengths of the triangle on the apex plateau can also be corrected after investigation of the Wall of the Crow area of the construction where the architects have added another sublime piece of numerical dexterity.

Diagram L6 shows the apex plateau triangle at the Wall of the Crow in detail, on which the hypotenuse of the triangle is formed from the line connecting the points WOCA and GP1NW.

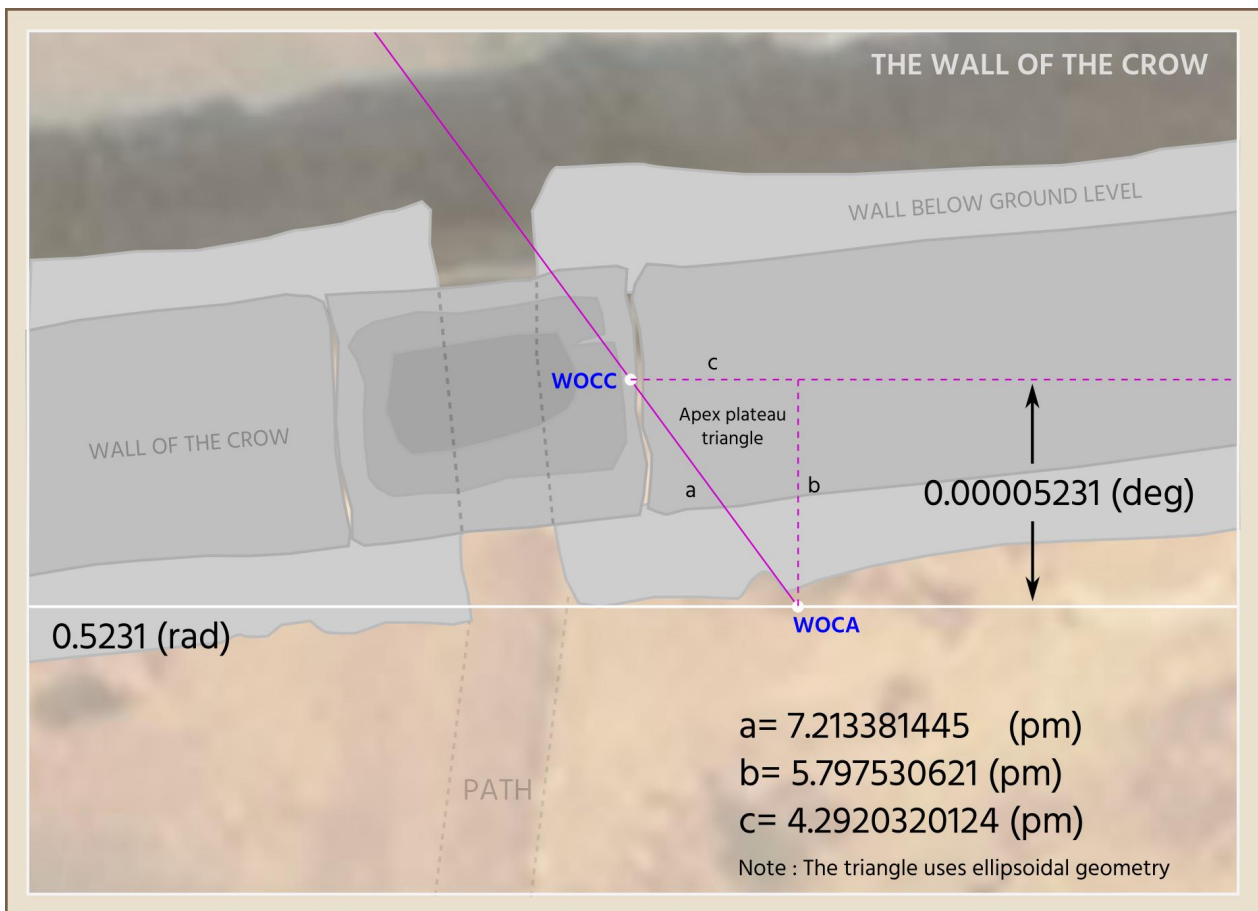


Diagram L6 - The apex plateau triangle at the Wall of the Crow.

The triangle shown in the diagram with side lengths a,b and c is identical to the triangle on the apex plateau of the Great Pyramid and is formed by adding 0.00005231 deg to the latitude grid line at 0.5231 rad. The dimensions of the triangle are shown in the illustration. The point marked as 'WOCC' is formed by adjusting the distance 'a' until the latitude of that point equates to the sum of the radian and degree latitude values. The difference in the length of line 'a' when compared to the triangle calculated on top of the Great Pyramid shown in diagram L1 is 2.5 cm which is a consequence of the errors involved in solving the complex geometry puzzle on the apex of the pyramid.

Step 6

The next logical step is to create the same triangle at the location of the center of the Great Pyramid in the same manner as was performed at the Wall of the Crow in step 5, which then defines the base center point of the pyramid from the pyramid's underground anchor point. Diagram L7 shows this arrangement which deliberately results in the center of the pyramid being repositioned to its correct location with respect to the underground anchor point and makes modern day survey measurements of the base center point redundant.

Step 7

With the principal locations in 2729 BCE calculated it is now possible to understand how the original surveying grid's latitude lines have been created. Looking at the details in the earlier paper⁴ in this series where the grid is first calculated, it was determined that the principal latitude line of the system ran through the center of the Wall of the Crow passage. It therefore runs through the point 'WOCC' on the system shown above. The latitude lines on diagram L2 need to be moved north from their current position in which the principal line at 0.5231 rad runs through the point 'WOCA'.

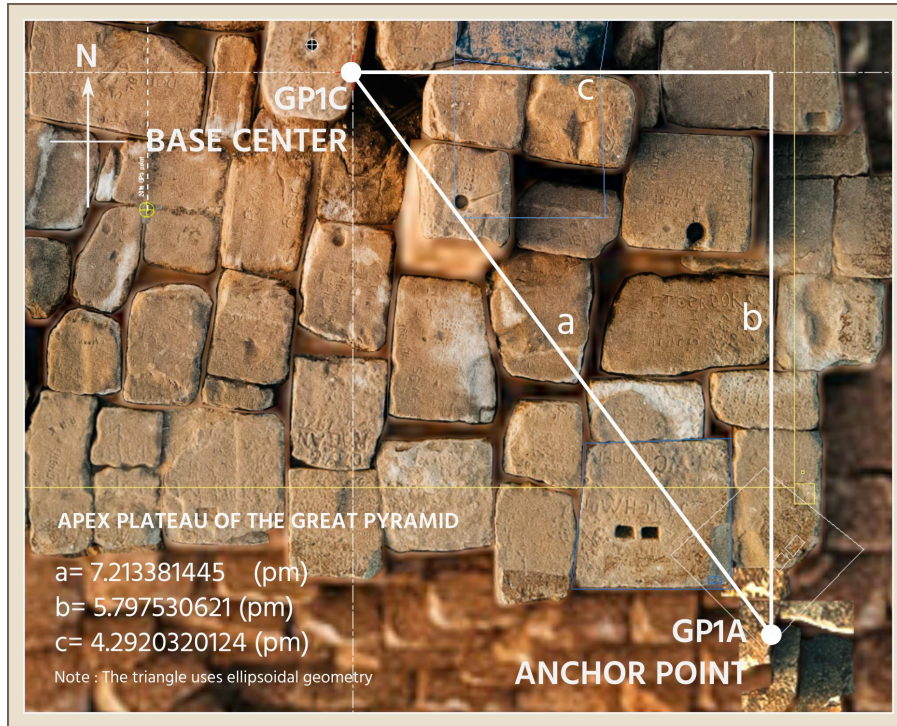


Diagram L7 - The base center point of the Great Pyramid on the apex plateau.

Because the latitude difference between these two points is the same as the latitude difference between the underground anchor point in the Great Pyramid and the base center location of the pyramid, the grid system can be solved in latitude only if working from the pyramid's base center point when the underground anchor point is still an unknown. This is the solution that was presented in the earlier paper⁴, and it is an incorrect solution that was embellished upon in the architecture on the Giza plateau to deliberately send the solution in the wrong direction.

Once the point 'WOCC' is established, which will only be after the apex plateau puzzle has been solved, the start of the longitude grid can also be correctly placed running through point 'WOCC' and the grid system can be solved in both longitude and latitude, as is shown in the next steps.

Diagram L8 shows the latitude and longitude grid lines passing through the point 'WOCC' to the east of the Wall of the Crow passage.

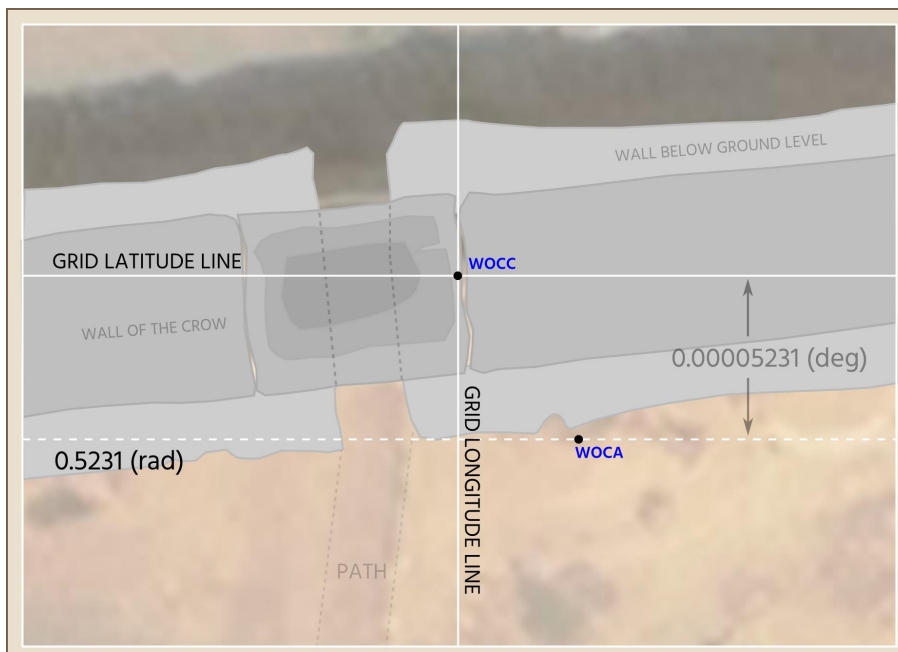


Diagram L8 - The initial latitude and longitude lines of the original surveying grid.

Step 8

From the work in the earlier paper⁴ regarding the grid's construction, the next stage is to create a series of longitude lines that are spaced exactly 333 pm apart at a particular latitude but which are actually defined by their angular longitude spacing, and for now this spacing will be measured at the latitude of the point 'WOCC'. With the grid rectangles formed, the translation in latitude of the grid columns, explained in the earlier paper⁴, needs to be applied, so that the column on the right, column 0, remains in its original place, the next row to the left is dropped by $1 \times (1/10 + 1/16)$ of a grid, the next row by $2 \times (1/11 + 1/17)$ in a continuing pattern. The result of this method of forming the grid is shown in diagram L9 with each row given a letter and each column given a number starting with the N.E. sub-grid as 'A0'.

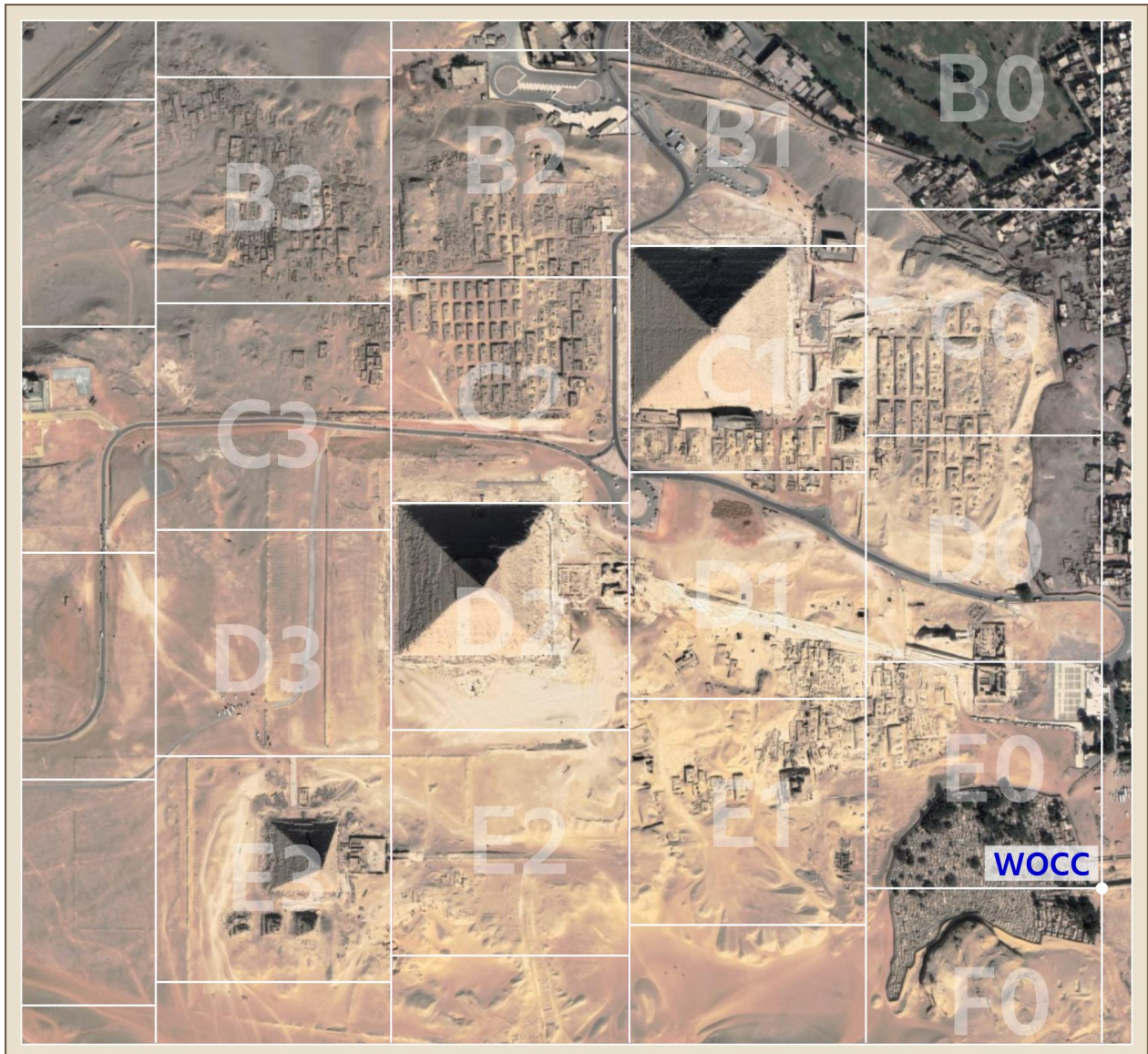


Diagram L9 - The grid system passing through the point 'WOCC'.

Step 9

Step 4 can now be repeated where the line from the point WOCC is drawn to the north north-west at the angle derived from the point's radius on the Earth's reference ellipsoid. The intersection point of this line with the grid marks out the N.W. casing corner of the Great Pyramid and therefore can be compared to the surveyed point at this location.

Diagram L10 shows the N.W. corner of the Great Pyramid taken from the work⁵ of Glen Dash with the geodesic grid lines of the S.W. corner of sub-grid B1 and the oblique line from the point 'WOCC' superimposed upon the diagram.

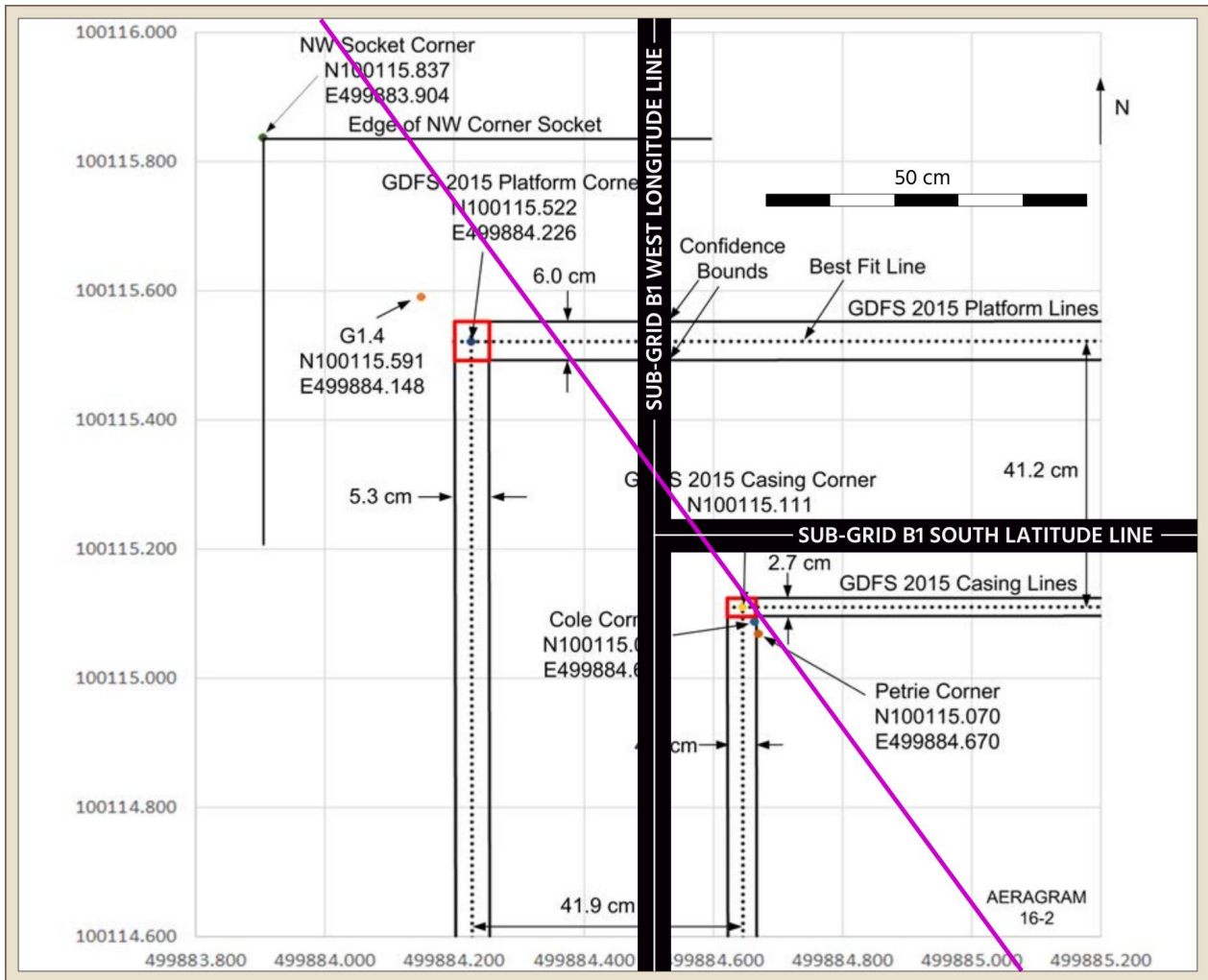


Diagram L10 - The N.W. corner of the Great Pyramid.

On the diagram it can be seen that the oblique line from 'WOCC' passes through the red rectangle which delimits the bounds of confidence of the survey measurements of the casing that was carried out by the Glen Dash team. However the latitude and longitude grid line intersection does not fall on the geometric oblique line so there must be a refinement required in the geometry.

Step 10

There are two variables that are being used to form the geometry shown in diagram L10 and by varying them the system can be calibrated so that the oblique line perfectly intersects with the west longitude line and the south latitude line of sub-grid B1.

Because the grid system is based on a 333 pm wide grid, and the latitude at which this distance is specified is fundamental to where the west longitude line of sub-grid B1 appears in the N.W. corner of the pyramid, it can be correctly deduced that by varying the latitude at which the 333 pm length is defined, the longitude line in diagram L10 can be adjusted so that it moves to the east. This is the first variable.

The oblique line's angle is created from the radius of the Earth's reference ellipsoid at the Wall of the Crow point, but the latitude of where this radius is taken is not necessarily in the correct place and can be adjusted so that the angle of the oblique line changes. Alterations to this latitude will make only tiny changes to the oblique line's angle but importantly will also change the position of 'WOCC' in relation to 'WOCA'. This is the second variable.

The calculations that were performed to calibrate the system are contained in the supplementary material of this paper, references to which can be found at the end of the document. As a starting measure, with the system being created as defined above, the west longitude line of sub-grid B1 is located 0.002857251 arc seconds to the west of the intersection of the oblique line and the latitude line.

The first variable contains the majority of the adjustment and through analysis and logic it can be determined that the location where the 333 pm sub-grid width is defined is located at the south of the main grid, 4 sub-grids below the Wall of the Crow point 'WOCC'. After this adjustment has been made the longitude line now lies 0.000046298 arc seconds to the east of the intersection point.

The second variable can now be adjusted, and was moved logically to the top of the main grid, 4 sub-grids to the north of the Wall of the Crow point 'WOCC'. After this adjustment the longitude line was located 0.000007672 arc seconds to the east of the intersect point.

By comparing this error value to other error values during the calibration, it could be seen that the main grid system would solve completely if a 9x9 grid was used and the latitude of the north casing line of the Great Pyramid (the south latitude line of sub-grid B1) was very logically used as the defining latitude of the Earth's radius. Applying these alterations to the system reduced the error of the intersect point and longitude line down to 0.000000123 arc seconds, a value that is within the computational accuracy of the computer system on which it is being calculated, and is therefore a final value.

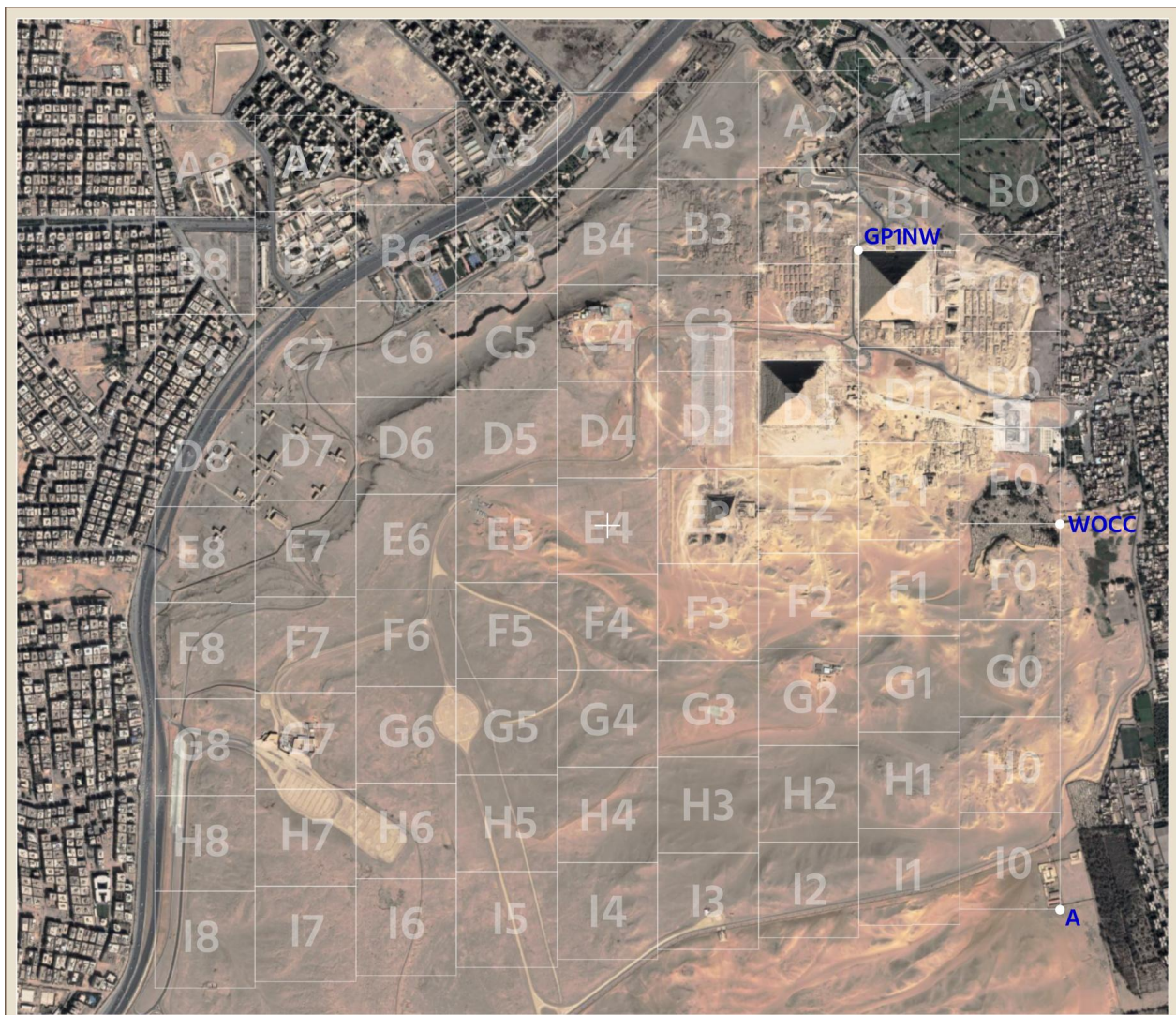


Diagram L11 - The 9x9 surveying grid on the Giza Plateau, adjusted to 2018 latitudes.

On diagram L11 the 9x9 grid is shown which was calculated mathematically at the 2729 BCE latitudes and then transposed north using the tectonic plate movement calculations to its 2018 position. The point 'A' on the diagram is the S.E. corner of the grid at which latitude the sub-grids are exactly 333 pm wide from east to west.

What is remarkable about this grid system is that the center point of the grid, marked with the white cross in sub grid 'E4', is located at exactly 0.5231000 radians north when the grid is created at its 2729 BCE latitude, that also being the defining starting latitude of the system at 'WOCA' and also the latitude of the south casing line of the 3rd pyramid. If you consider how the grid has been formed starting from the point 'WOCC', creating the east column of sub-grids up to the N.E. corner, and then dropping each grid column down by a systematic but varying amount each row to the west, it is astonishing that the grid center falls at this latitude. There is no question whatsoever that this grid construction is correct in every aspect.

Step 11

The longitude shifts to the sub-grids detailed in the earlier paper⁴, where each row starting from row 1 is shifted 1/55th of a sub grid to the east relative to the row above, can now be applied to the system and the method for doing this can be refined from that which was described in the earlier paper because the main grid is now known to be a 9x9 grid.

The 55th calibration pit to the west of the 2nd pyramid was used in the previous paper to define a regular shift in the sub-grids of each row to the east by 1/55th of the width of the sub-grid. If the 55th calibration pit is looked at in more detail, the method of shifting the sub-grids to the east can be embellished upon. Diagram L12 shows the calibration pit's details.

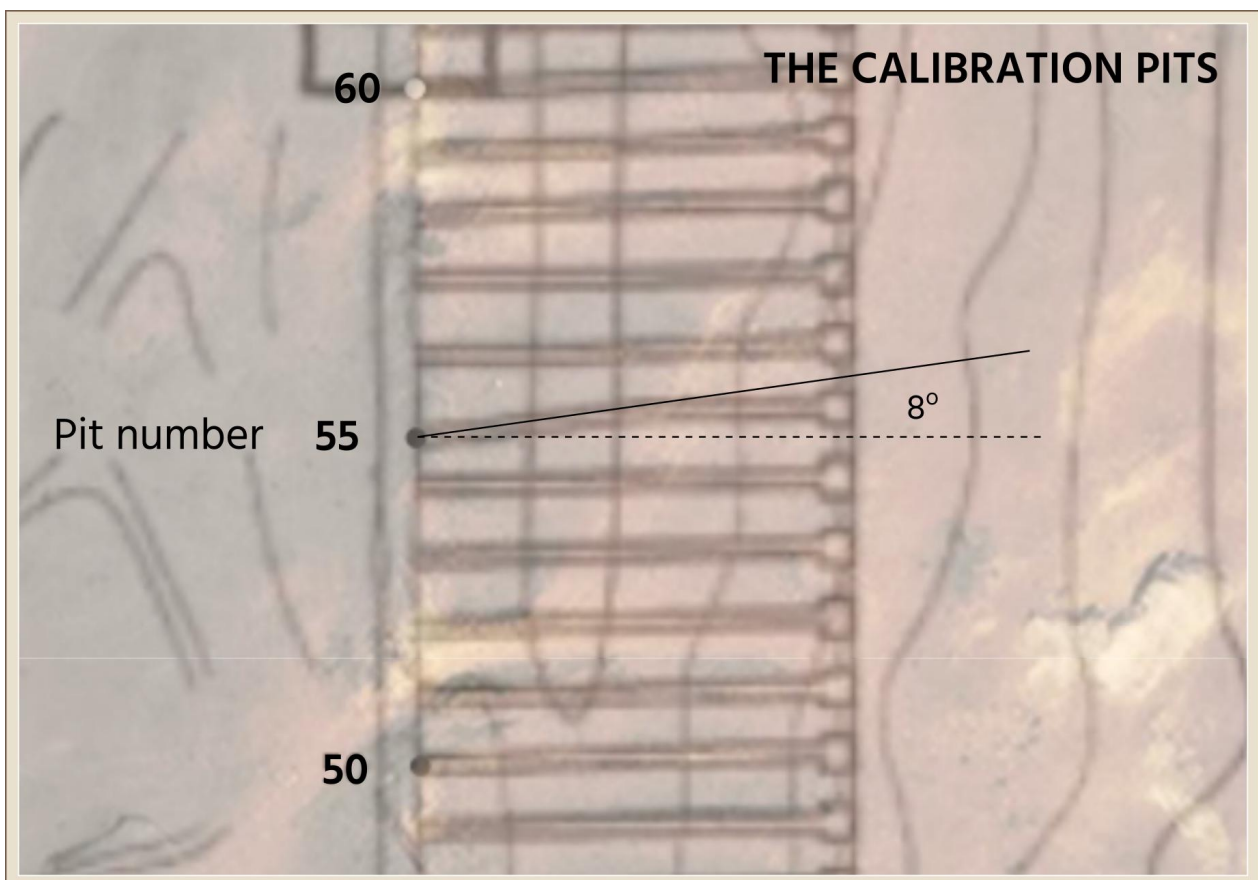


Diagram L12 - The detail of the 55th calibration pit.

The pit's angled wall section is set at 8 deg from an east-west line, and this simple construction is giving a numerical value of 55/8. With the top row of the sub-grids being row A then the longitude shift that is required to be applied to each sub-grid is given by the following formula:

Row A	0	
Row B	$+1 / (55 - 0 \times 55/8)$	of a grid
Row C	$+1 / (55 - 1 \times 55/8)$	of a grid
Row D	$+1 / (55 - 2 \times 55/8)$	of a grid
Row E	$+1 / (55 - 3 \times 55/8)$	of a grid
Row F	$+1 / (55 - 4 \times 55/8)$	of a grid
Row G	$+1 / (55 - 5 \times 55/8)$	of a grid
Row H	$+1 / (55 - 6 \times 55/8)$	of a grid
Row I	$+1 / (55 - 7 \times 55/8)$	of a grid

Table L12 - The adjustments to the longitudes of the sub-grids.

where each row is shifted by an addition of all the rows before and including it. Note that in this system a) the N.W. corner of the Great Pyramid is not altered by the 55/8 fraction adjustments and b) if you were to add another row at the bottom of this system the mathematics would fail because the denominator of the fraction would be zero, adding further confirmation to the validity of the 9x9 grid system.

Diagram L13 shows the results of applying the additional grid longitude shift and diagram L14 shows the north side of the 2nd pyramid where the casing corner and northern face is defined by the grid system.



Diagram L13 - The longitude shifted 9x9 grid.

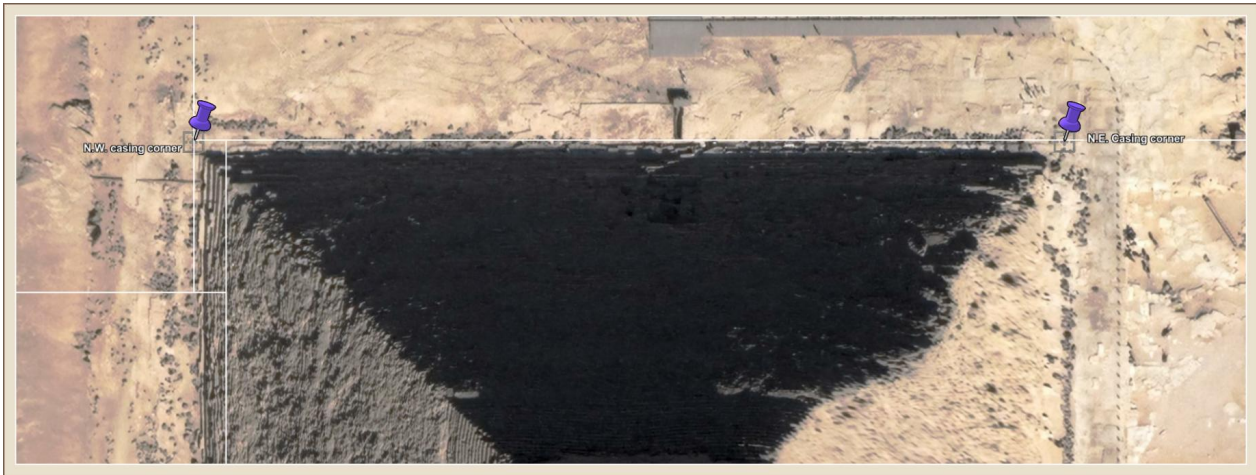


Diagram L14 - The detail of the north side of the 2nd pyramid.

In diagram L14 the marker points from Petrie's survey coordinates are shown in the N.W. and N.E. corners of the second pyramid and it can be seen in the N.W. corner that both the latitude and the longitude of the corner are marked out closely by the grid. Remarkably, *there is no significant error* in the longitude with the 2018 grid longitude showing 31.12962438 deg and Petrie's 2018 adjusted corner marker showing 31.12962439 deg. This longitude difference equates to just less than 1 mm of ground distance.

The latitude of the northern face grid line is 40 cm north of Petrie's marker. Because the 9x9 grid is locked in place due to the first and second columns being connected perfectly by the oblique line from 'WOCC' and furthermore that the center marker of the main grid is set at the fixed latitude of 0.5231 rad in the 2729 BCE construction, this latitude discrepancy must be intentional and is probably designed to align with the platform edge of the 2nd pyramid, rather than the casing edge.

The grid system defines the N.W. corner of the 1st pyramid of Giza, the west side of the 2nd pyramid and the southern side of the 3rd pyramid. Because of the inherent errors in the modern surveying, namely the precision of the GPS survey point is unknown and the surveying points on the plateau are referenced to the GPMP localised control grid, it is not possible from the foregoing information to determine *with certainty* which ground features the grid corner points relate to. They appear to be the casing corners but could just as well be the platform corners if the 2018 GPS measurement and the subsequent transposition of the 2015 corner points contains an error of 15 cm or so. The only way to definitively resolve this problem is to determine the geometric grid system's locations of the four corners of the Great Pyramid.

Step 12

The four corners of the Great Pyramid can be fully resolved using the marker points in the grid system shown above. The method to produce them requires solving using the inherent geometry of the overall system and some logic analysis but is considerably easier to solve than the apex plateau puzzle that was presented in the previous paper in this series.

Using the geometric corner point 'GP1NW' as the primary reference and the base center of the pyramid point 'GP1C' as the defined ground level center of the building, a line at a bearing of 45° is taken from 'GP1C' and its length is determined by adjusting the value in a geodesic calculator until the end point of the line falls on the latitude of the point 'GP1NW', calling this geometric corner 'GP1NE'. Then, a line at a bearing of 135° is taken from the center point and is adjusted so the that the longitude of its end point falls on the longitude of the point 'GP1NE', calling this point 'GP1SE-a'. The north and east sides of the pyramid's geometry are thereby defined.

Starting again using the point 'GP1NW', a line is taken from the base center of the building at a bearing of 225° and using the same procedure its length is adjusted so that its end point falls on the longitude of the point 'GP1NW', calling this point 'GP1SW'. Finally, a line is taken from the base center at an angle of 135° and is adjusted so that it terminates at the latitude of the point 'GP1SW', calling this point 'GP1SE-b'. The west and the south sides of the pyramid's geometry are thereby defined.

Diagram L15 shows these two construction systems and the resulting two points in the S.E. corner of the building superimposed on aligned detailed GPMP survey maps of the corner locations.

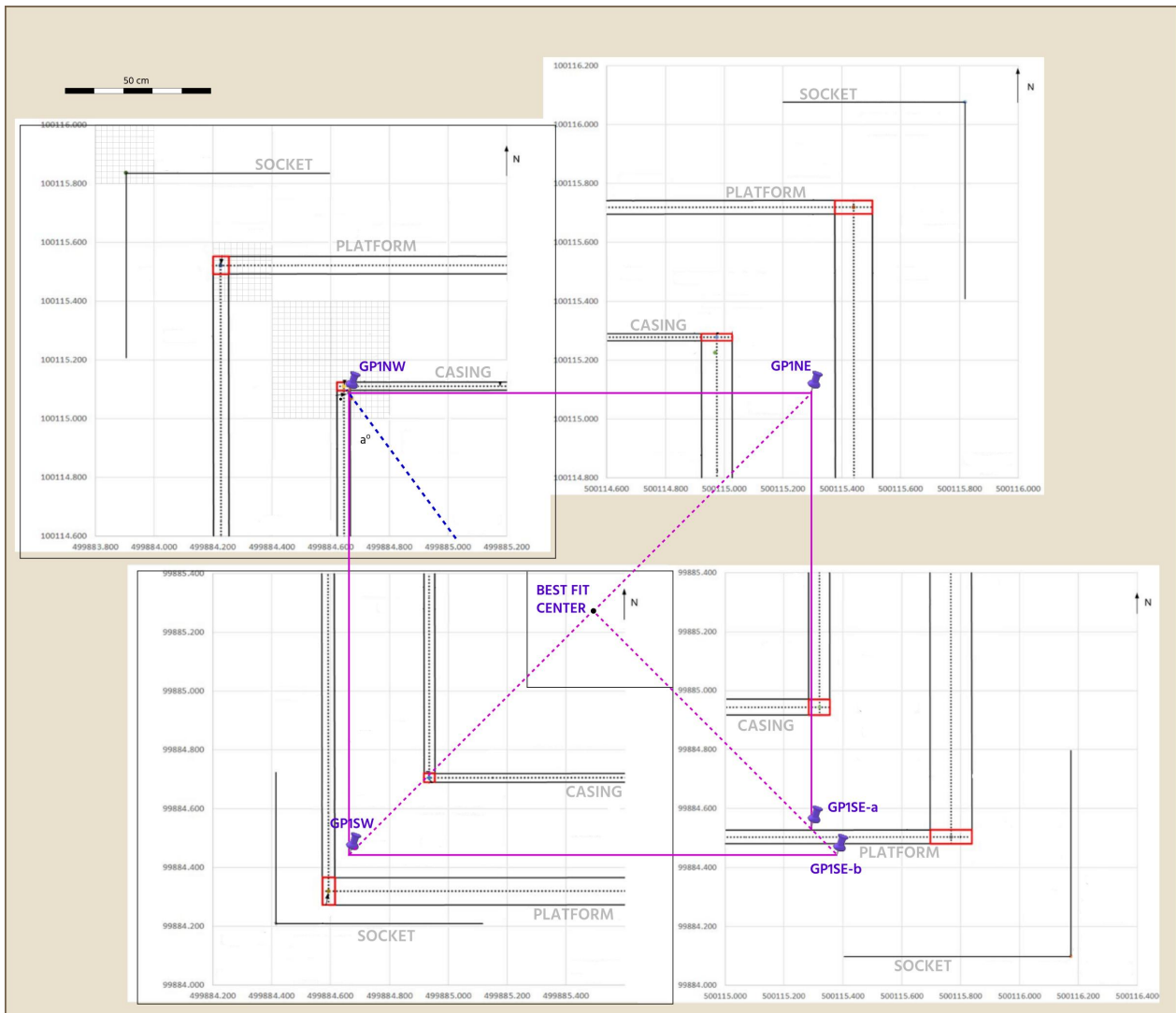


Diagram L15 - The first part of the geometric construction of the corner points.

The background images on the diagram are taken from the work of the Glen Dash foundation with most details edited out to leave just the pyramid's structures, and show the grid squares of the GPMP survey grid which are aligned on the four individual images. The purple solid lines show the sides of the geometry that were calculated from the corner diagonals, those being shown as purple dashed lines. The dashed blue line is the Giza plateau's primary alignment running from the Wall of the Crow point 'WOCC' to the point 'GP1NW'. The background image has been aligned to a best fit position with the geometry taking the point 'GP1NW' as being the surveyed N.W. casing corner of the pyramid.

As can be seen, by forming the geometry by going around the pyramid from the N.W. corner to the S.E. corner in both directions two points are created in the S.E. corner of the geometry which are about 12.5 cm apart.

The center of a line joining these two points falls on the S.E. corner's platform edge line and is inline with the S.E. corner's east casing line, as shown in diagram L16.

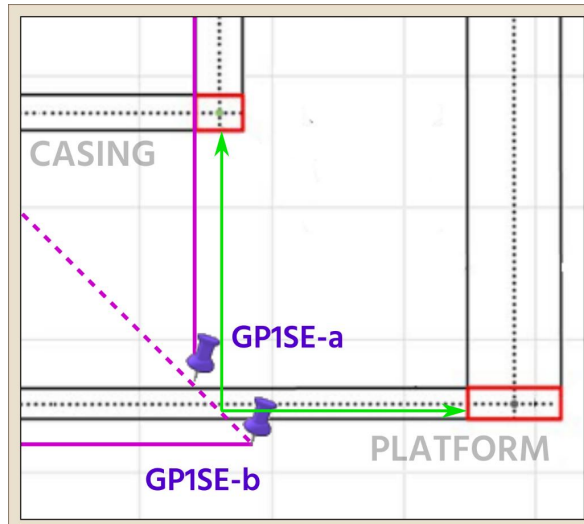


Diagram L16 - The S.E. corner detail and the geometry alignment to the building.

Working correctly on the theory that this alignment is not coincidental, a new point 'GP1SE' can be created at the midpoint between 'GP1SE-a' and 'GP1SE-b' and then the geometric alignment of the four pyramids corners can be resolved graphically as shown in diagram L17.

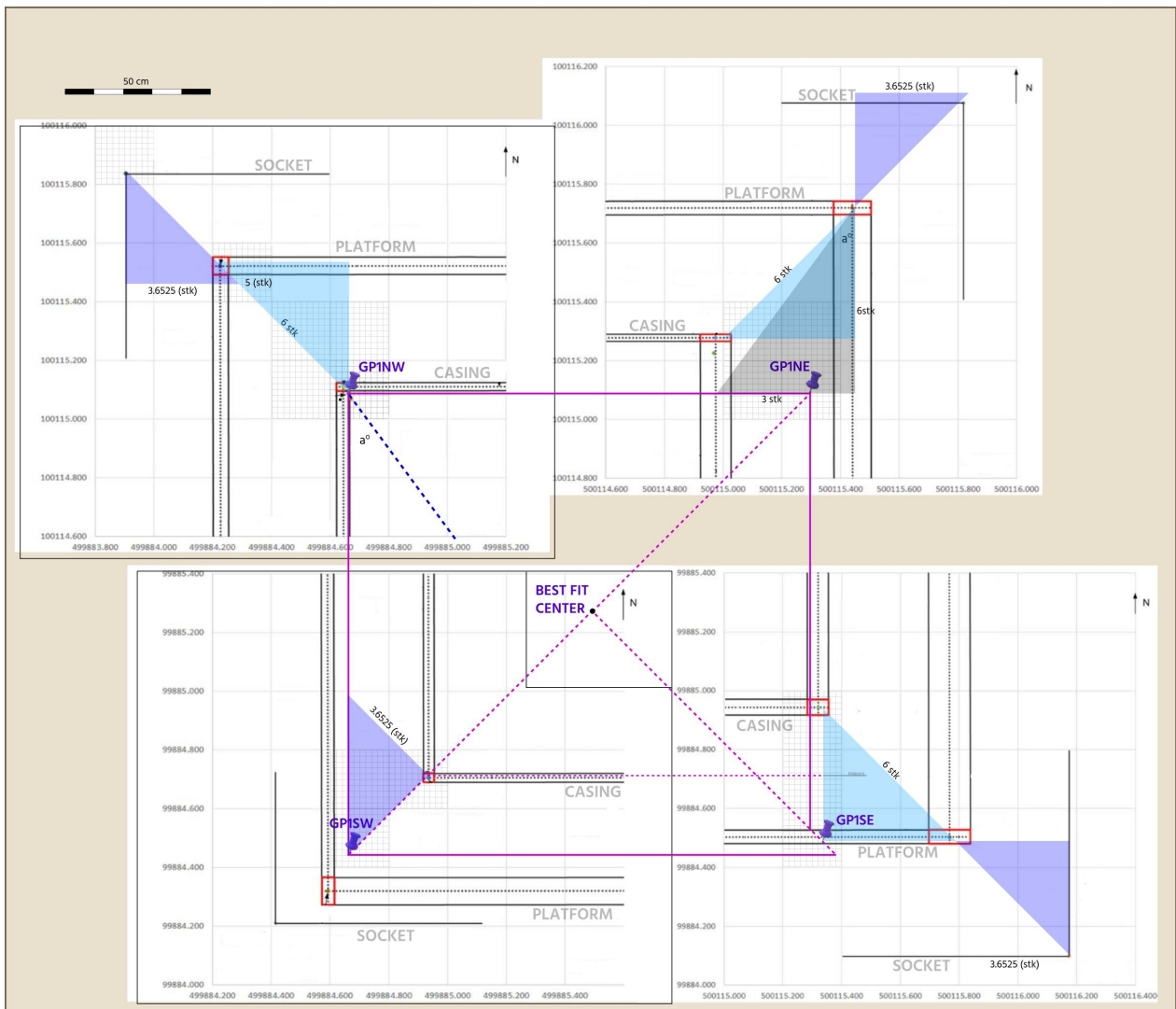


Diagram L17 - The geometry of three of the corners of the Great Pyramid.

Each of the three corners is identical in construction method where there are two 45° right angled triangles placed with their hypotenuse in line with each other and their other sides aligned to the cardinal points. The end points of the two hypotenuses mark out the casing corner, platform corner and socket corner.

The inner triangles, coloured in light blue, are all identical and have a hypotenuse length of 6 stk or 0.6423 m, the unit being the architect's stack constant⁶ unit from the main chamber of the pyramid.

The outer triangles, coloured in purple, are also identical to each other and have a side length of 3.6525 stk which is derived directly from the average length of the solar year, and therefore a hypotenuse of 0.5530 m.

The manner in which the purple triangles attach to the light blue ones differs at each corner. In the S.E. corner of the pyramid and in the N.E. corner the triangle corners share the same point. In the N.W. corner the outer purple triangle's S.E. corner is located 1 stk along the hypotenuse of the inner light blue triangle. In the S.W. corner there is only one triangle.

The grey triangle in the N.E. corner is similar (in the mathematical sense) to the plateau master triangle that is used on the apex plateau and the Wall of the Crow, with its hypotenuse angle defined by the line from 'WOCC' up to the N.W. corner of the building but reflected in a north-south axis. Its longer side length is 6 stk and it is attached to the point 'GPINE' at a distance of 3 stk along its shorter side. The grey triangle's northern apex defines the platform corner, from which the casing corner and the socket corner can be calculated.

The S.W. corner is constructed in a different manner to the other three corners and is shown in diagram L18.

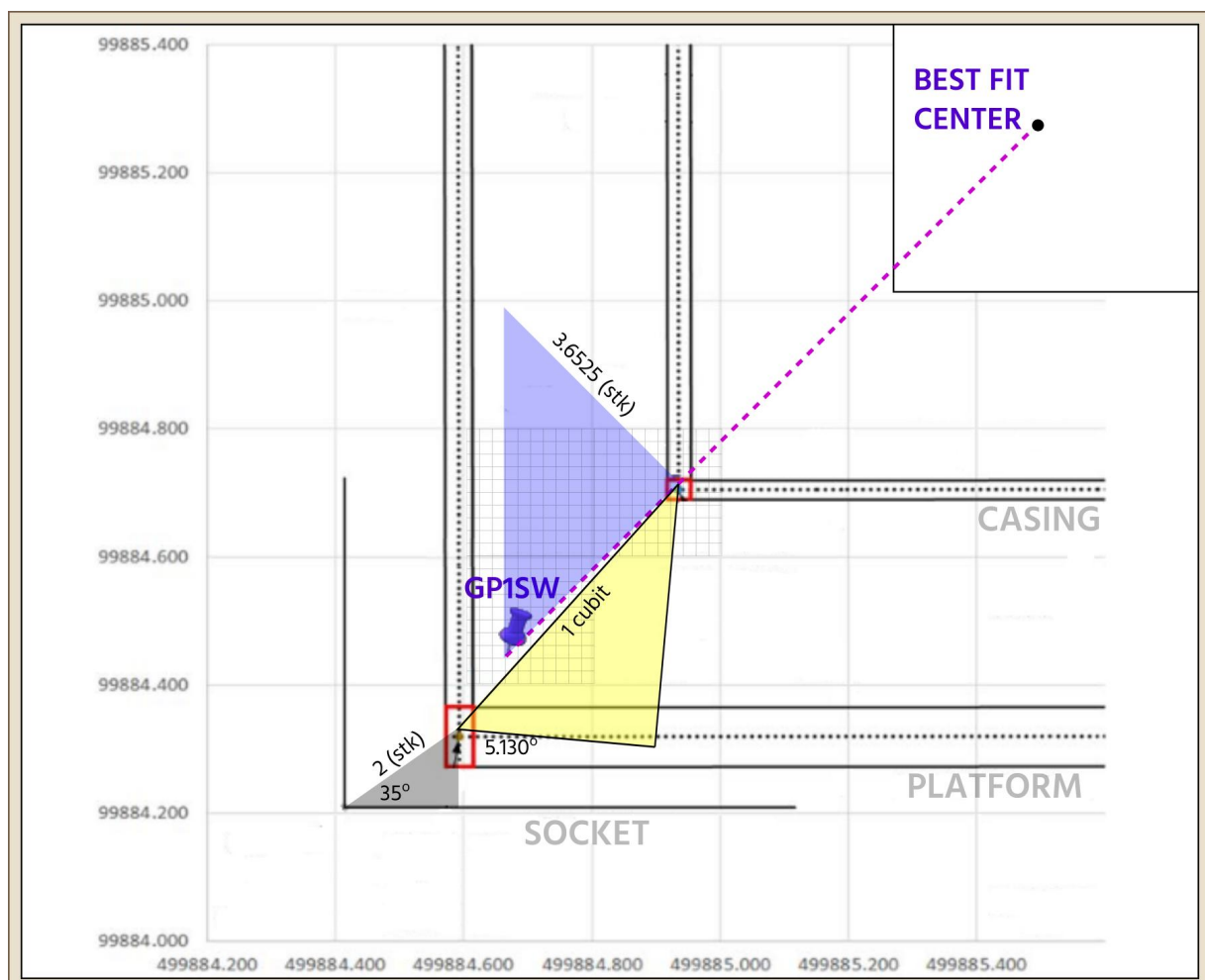


Diagram L18 - The geometric construction of the S.W. corner of the Great Pyramid.

The purple triangle is identical to that of the S.E. corner but rotated by 135° anticlockwise and its southern side allows the casing corner to be determined from the point 'GP1SW'. The yellow triangle has a hypotenuse side length of 1 cubit and has the same side length proportions (3,4,5) and rotation angle as the starting triangle on the apex plateau shown in the last paper¹. Because this triangle is an exact copy from the apex plateau the angle between the hypotenuse and the 225° bearing line through the point 'GP1SW' must be 3°, putting the bearing of the hypotenuse at 222°. This triangle allows the platform corner to be established. The grey triangle has a hypotenuse length of 2 stk and a corner angle of 35° as shown in the diagram.

The reason that this corner of the pyramid is constructed in this manner is specifically so that it contains the component part that is required to solve the apex plateau.

Before finalising the system and plotting the corner points, the best fit center point needs to be understood. The pyramid's internal geometry contains an 1:87500 model of the Earth's reference ellipsoid that is tilted⁷ at an angle of 23.9960688 deg. Because the polar cross section is elliptical and the ellipse is tilted, if the base center of the Earth model is located at a nominal latitude of 0 meters then the upper turning point of the ellipse is located at a relative latitude of -0.366228 m and the center of the Earth's ellipse is located at -0.183114 m. The best fit center point on diagrams L15,L17 and L18 is located at the GPMP grid coordinates of N 99999.81552 , E 500000.02064 and it can be seen that the best fit center point should be the center of the Great Pyramid at the mid point of its height because 99999.81552 + 0.183114 gives the base center point as being N 99999.99866 and just 1.3 mm from the GPMP grid center.

Using the original definition of the pyramid's base center point on the GPMP control grid as being N100000.0 and E 500000.0 and then using the mid height latitude offset it is possible to determine a provisional value for the mid height center point as being N 99999.81689 E 500000.0. This point can be given the name code 'GP1X' and it marks the three dimensional center of the Great Pyramid.

With the center point understood it is now possible to define the 12 casing, platform and socket locations of all four corners of the Great Pyramid by using the inherent elliptical geometry of the architect's original surveying grid and the geometric components shown in the preceding description. The 12 corner points are shown on diagram L19 in which the connected background images, taken from the work of Glen Dash, have been adjusted to their best fit position.

It is important to understand how the diagram has been created. The points have all been calculated at their 2729 BCE locations, the distances between the points have then been calculated on a geodesic calculator, then the linear distances from 2729 BCE have been used to mark the points onto the modern GPMP grid system. It is not possible to simply move the original points, which are defined by their latitude and longitude, to the north by the tectonic plate latitude change and then plot them onto the GPMP grid because there is an inherent error in longitude distances involved when this incorrect approach is taken. For example, the north face of the pyramid would be 4.5 mm shorter than it actually is when the incorrect approach is taken.

The calculated grid coordinates of the point GP1NW-c when using the grid centered at N100000.0 and E 500000.0 can now be compared to the best fit grid coordinates of that point, and the grid's offset from the base center of the pyramid can be calculated as -0.03799 N and 0.05907 E which places the base center of the pyramid and the mid height center point on the GPMP control grid as

GP1C	N 99999.96201	E 500000.05907
GP1X	N 99999.77890	E 500000.05907

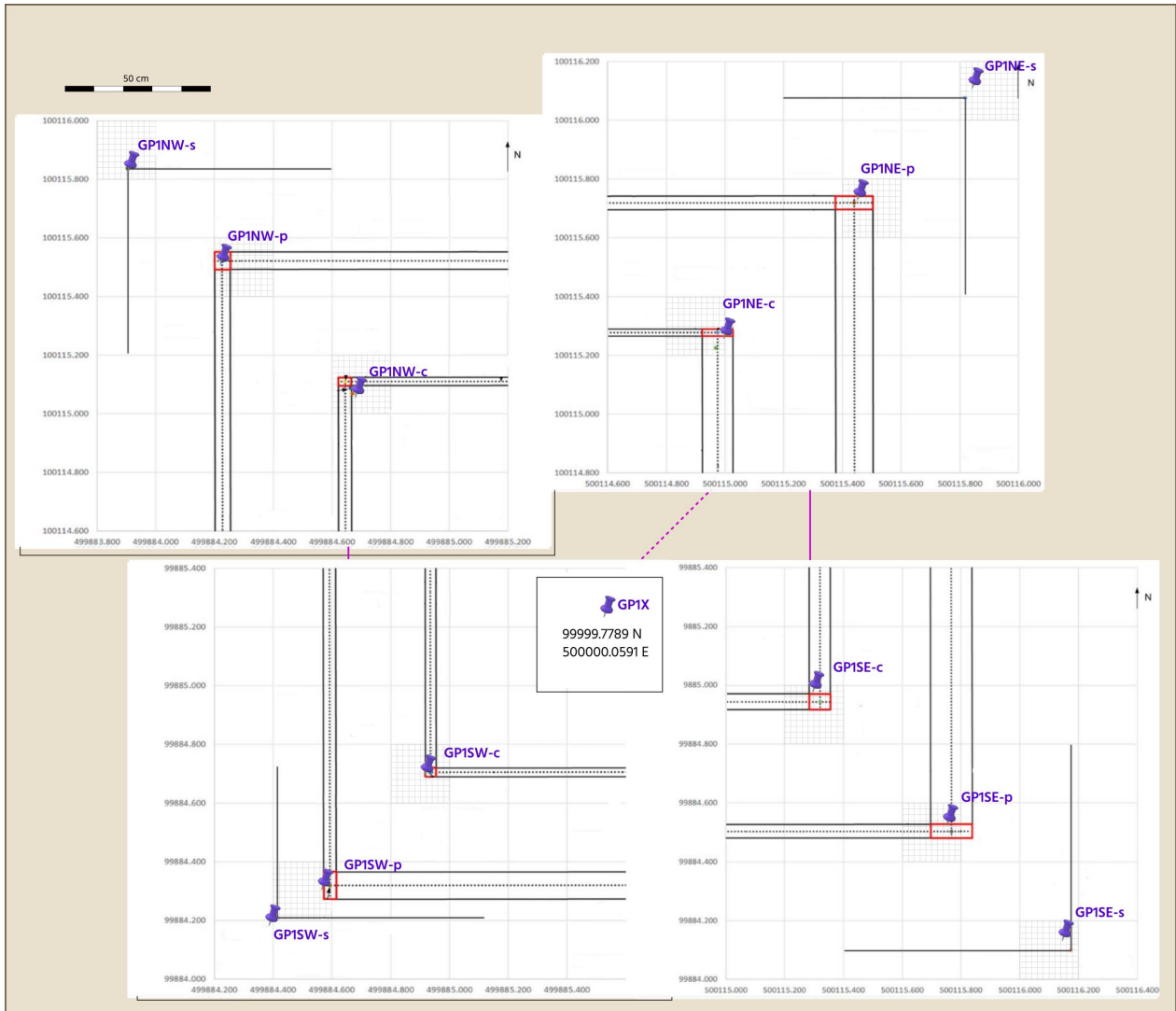


Diagram L19 - The 12 corner points of the Great Pyramid.

The correlation between the the location of the base center point on the control grid from the Glen Dash team and the point 'GP1C' of 6 cm in both latitude and longitude is not relevant because the point 'GP1C' is formed from geometry and the Glen Dash value is determined from averaging out surveying measurements.

From the foregoing data points, the side lengths and angles of the sides of the pyramid can be calculated on a geodesic calculator and are shown in tables L20,L21 and L22 which have been formatted in a similar manner to those in Glen Dash's article for ease of comparison.

All of the lengths and angles that have been computed from the geometric construction fall within the tolerances that are reported in the surveying and many fall towards the center of those tolerance margins. Of note in the tables is that the average side angle of the casing stones from the geometric construction is 0.63 arc seconds different from the surveyed average.

The angles of the south and west casing lines of the geometric construction of the pyramid's corners are simple radian values of 0.001 and 0.0012 radians respectively and reversing the calculation would give side angles of -3' 26.2648" and -4' 7.5178" at these radian values.

All computations in the tables have been carried out at 2729 BCE latitudes.

Lengths of the sides of the casing				Angles of the sides of the casing				
Casing Side	Length (m)	Glen Dash survey (m)	Δ (mm)	Casing Side	Azimuth (d.m.s.)	Glen Dash survey (d.m.s.)	Δ (d.m.s.)	Design Azimuth (radians)
North	230.355	230.329	- 26	North	-2' 48.5714"	-2' 30"	-0' 18.57"	
East	230.338	230.334	+ 4	East	-5' 15.8374"	-5' 10"	-0' 5.84"	
South	230.436	230.384	+ 52	South	-3' 26.5714"	-3' 35"	+0' 8.43"	0.001
West	230.380	230.407	- 27	West	-4' 7.5294"	-4' 21"	+0' 13.47"	0.0012
Average	230.377	230.363	+ 14	Average	-3' 54.6274"	-3' 54"	-0' 0.63"	

Lengths are the geodesic lengths computed between the end points of the sides at 2729 BCE latitudes.
Angles are the average of the 2729 BCE forward and reverse azimuths between the end points of each side.

Table L20 - The casing sides of the Great Pyramid's geometric formation.

Lengths of the sides of the platform				Angles of the sides of the platform				
Platform Side	Length (m)	Glen Dash survey (m)	Δ (mm)	Platform Side	Azimuth (d.m.s)	Glen Dash survey (d.m.s.)	Δ (d.m.s.)	Design Azimuth (radians)
North	231.263	231.214	+ 49	North	-2' 47.9105"	-2' 56"	+0' 8.09"	
East	231.246	231.215	+ 31	East	-5' 14.5883"	-4' 53"	-0' 21.59"	
South	231.240	231.174	+ 66	South	-2' 27.5422"	-2' 45"	+0' 17.46"	
West	231.223	231.204	+ 19	West	-5' 39.4933"	-5' 28"	-0' 11.49"	
Average	231.243	231.202	+ 41	Average	-4' 2.3836"	-4' 00"	+0' 2.38"	

Lengths are the geodesic lengths computed between the end points of the sides at 2729 BCE latitudes.
Angles are the average of the 2729 BCE forward and reverse azimuths between the end points of each side.

Table L21 - The platform sides of the Great Pyramid's geometric formation.

Lengths of the socket sides				Angles of the socket sides				
Platform Side	Length (m)	Glen Dash survey (m)	Δ (mm)	Platform Side	Azimuth (d.m.s)	Glen Dash survey (d.m.s.)	Δ (d.m.s.)	Design Azimuth (radians)
North	231.969			North	-3' 54.7064"			
East	231.983			East	-5' 13.5208"			
South	231.761			South	+1' 31.4384"			
West	231.662			West	-7' 43.4037"			
Average	231.821			Average	4' 5.7673"			

Lengths are the geodesic lengths computed between the end points of the sides at 2729 BCE latitudes.
Angles are the average of the 2729 BCE forward and reverse azimuths between the end points of each side.

Table L22 - The socket sides of the Great Pyramid's geometric formation.

Step 13

The work in step 12 verifies that the architect's survey grid in the N.W. corner of the Great Pyramid is correctly placed and that the survey grid is correctly formed in longitude and latitude for the first three rows and the first two columns. The validity of the whole 9x9 grid can be verified by checking the longitude of the center point of the grid, shown in diagram L11 with the white cross, against the Wall of the Crow grid start point 'WOCC', the latitude having already been verified as falling on the 0.5231 rad latitude line in 2729 BCE.

To the west of the third pyramid are a number of wall sections the positions of which so far have not been identified. These walls are shown in diagram L23.



Diagram L23 - The walls to the west of the third pyramid of Giza.

On the diagram the latitude lines that run through the points 'WOCC' and 'WOCA' are marked and through measurement on the mapping application the northern wall was found to be three times the distance from the 'WOCC' latitude line as the southern wall. These walls are clearly part of the fundamental geometric system on the Giza plateau.

The western wall contains a small bend around the center of it and consequently the S.W. corner of the wall construction is not in line longitudinally with the N.W. corner. If the west wall is marking out a distance then it must be marking out two distances that are very closely related to each other.

Because the positions of the north and south walls dictate that their alignment is with the point 'WOCC' then an analysis was performed on the distance of the west wall from this point and the S.W. corner was found to be 1445 m in longitude from it, and the N.W. corner was found to be 1449 m in longitude from the point. These distances were then compared to the circumference of the Earth's reference ellipsoid at the latitude of the point 'WOCC' and the method of positioning of the wall sections determined.

The Earth reference ellipsoid's circumference at this 2729 BCE latitude is 34686795.298 m and if this distance is segmented into thousandths of an hour sections or 1/24000 of a solar day, each section will be 1445.283 m in length. The southern section of the western wall is marking out this distance from the point 'WOCC' along the Earth's circumference at this latitude in 2729 BCE and is the distance that is traversed in 3.6 seconds due to the rotation of the Earth on its axis.

If, instead of using the solar day the sidereal day is used which is 99.727 % of a solar day, then the latitude circumference needs to be divided into 1/23934.47 parts making each section 1449.24 m in length which is what the N.W. corner of the west wall is marking out. This system can then be plotted on a geodesic calculator in 2729 BCE, shifted by the tectonic plate movement calculated earlier, and then superimposed upon the satellite imagery of the mapping application, Google Earth, in 2018 the result of which is shown in diagram L24.

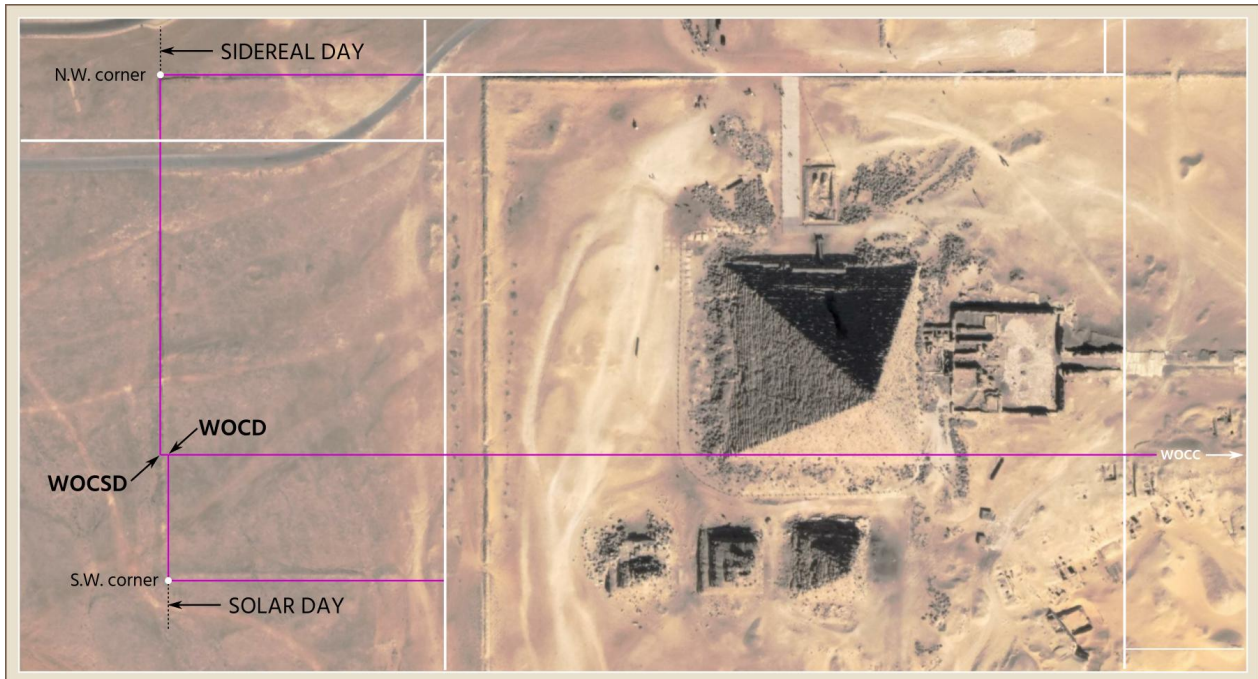


Diagram L24 - The geodesic solution to the walls to the west of the third pyramid of Giza.

The diagram is a screen shot from the mapping application on which the S.W. and N.W. corner points of the west wall have been connected back to the 9x9 original surveying grid of the plateau. The grid lines are shown in white and the day length lines are shown in purple. The two terminating points along the line from the point 'WOCC' are given the names 'WOCD' for the point that marks out the solar day length segment and 'WOCS' for the sidereal day segment.

Because the accuracy of the wall locations is impossible to verify as they have not been surveyed and therefore the use of the sidereal day value could be spurious, it was surmised that there may well be a marker point to the east of Giza which is located using a similar technique to that just seen. If the prime meridian of the architect's system falls on the Giza plateau and is based on the solar day then the point at which the sidereal day would be marked out should be located around 0.983 degrees to the East of Giza on the same latitude as the 'WOCC' line.

To evaluate this proposal the current value of the sidereal day, 86164.0905 seconds was recalculated for 2729 BCE by using the fact that the Earth's rotation is slowing down and the length of a day is growing by an estimated 0.0017 seconds per century⁸. This gives the 2729 BCE value of the sidereal day as 86164.00982 seconds and therefore the longitude of the marker should be at 0.9832924 degrees east of the point 'WOCC' at the latitude and longitude 29.971474 N 32.123214 E.

Diagram L25 shows the structure that was found at this location somewhat west of a town called Agrod, with its latitude and longitude, its dimensions in meters and its wall angles marked onto the diagram along with a map showing the location relative to Giza.

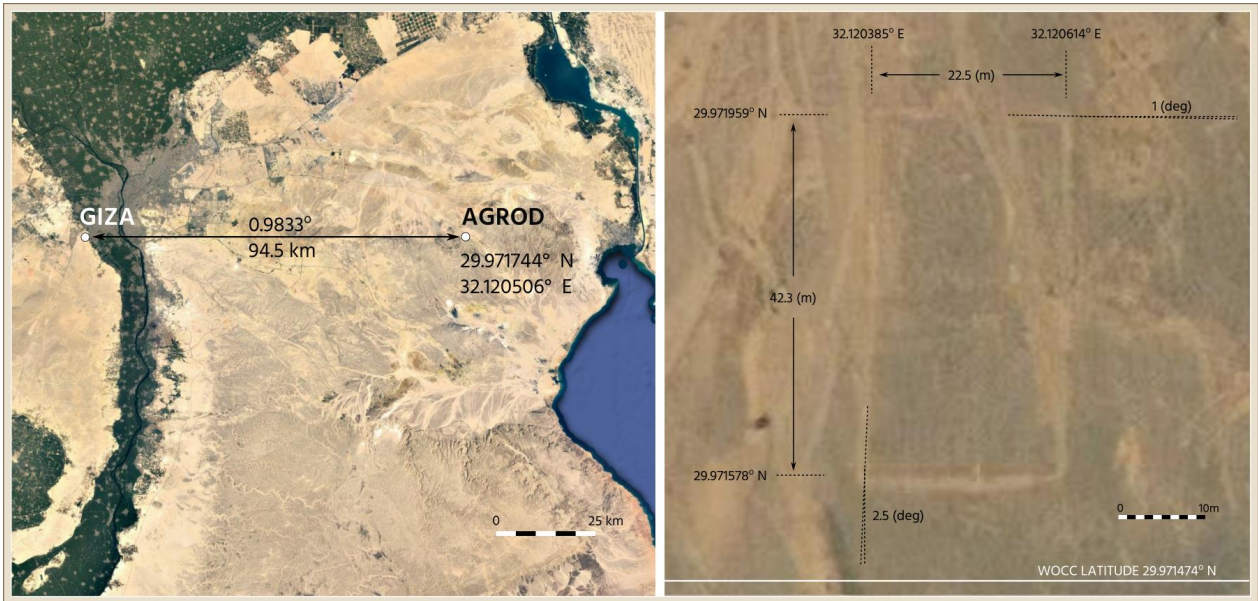


Diagram L25 - The sidereal day marker to the east of Giza.

This structure is 94.5 km east of the point 'WOCC' at Giza and is located 260 m west of the predicted point. At the bottom of the diagram is the latitude line that passes through the point 'WOCC' and analysis of previous satellite images in this area on Google Earth shows geo-locating errors on the images of up to 10 m in latitude, from which it can be deduced that the southern line of the structure probably aligns with the white latitude line on the diagram and the satellite image is incorrectly placed by a few meters.

The south and east walls of the structure are in line with the cardinal points, the north wall is set at 1 deg south of east and the southern section of the west wall is set at an azimuth of 2.5 deg. There is a digital artifact line just north of the southern wall which was cross checked against other satellite images to ensure that there were no distortions in the image being used.

The dimensions of the structure are the *exactly* same as the internal dimensions of the Sphinx temple in Giza, as shown on diagram L26.



Diagram L26 - The Sphinx temple and the unknown structure size comparison.

The exquisite archaeological drawing on the left is from Mark Lehner⁹, and as can be seen the shape of the unknown structure and that of the inner temple walls are identical in both size and in the unusual side angles of the north and west-south walls.

It is now possible to reverse the calculations, use the unknown structure as the marker for sidereal day and determine the longitude on the Giza plateau at which the prime meridian must be placed. Using the N.E. and N.W. corners of the structure as reference points and calculating the degree shift back to Giza places the unknown structure on the WOCC line as shown on diagram L27.



Diagram L27 - The prime meridian marker points on the Giza plateau.

The center line of the translated unknown structure, the prime meridian longitude line, falls directly in line with the rear of the Sphinx statue.

The validity of this alignment can be checked, that is to say that it can be shown to be part of the original design of the plateau, because the prime meridian line must be linked to the N.W. corner reference point of the Great Pyramid to be of any meaningful use.

The correlation between these points can be determined by referring to the precision surveying results from the GPMP and Glen Dash teams on their control grid, rather using latitude and longitude points. Diagram L28 shows the survey points from the N.W. corner of the Great Pyramid and from the rear of the Sphinx which are taken from the publicly available files¹⁰ of the Glen Dash foundation.



Diagram L28 - The primary surveying points on the GPMP control grid.

The easting of the most westerly point of the Sphinx is at GPMP point reference number 18435 and has an Easting of 500291.146 and the Easting of the N.W. corner point of the pyramid is 499844.645 giving the longitudinal distance between these two points as 406.501 m.

If the N.W. corner point of the Great Pyramid is taken as being the prime meridian marker for an average *year* length of 365.25 days, that is to say that after 365.25 days of rotations the N.W. corner of the pyramid will return to its original longitude, then the rear of the Sphinx survey point will be marking out a slightly shorter year length. The value of this year length can be computed on the latitude line of 'WOCC' by defining a point on this line at the longitude of the N.W. point of the Great Pyramid and then computing the longitude of the rear of the Sphinx at a bearing of 90° , a distance of 406.501 (m) and with the calculations performed at the 2729 BCE latitudes.

The longitude of the Sphinx rear is 31.137222 deg, the longitude difference between the points is 0.007597196 deg and therefore the length of year being marked out by the rear of the Sphinx is 365.2422920111 days.

The modern day value of the long term average year length is widely known to be 365.2422 days.

Because the Sphinx statue has a quite clear ancient surveying point marked by a small obelisk like statue at its east end between its paws, the same calculation can be performed to this point to determine the instantaneous value of the year length at the moment of the 2729 BCE winter solstice. The survey points used in this calculation are shown in diagram L29. The average Easting of the two modern survey points on the GPMP grid is 500361.102 giving the longitude distance from the N.W. corner of the Great Pyramid as 476.457 m. The resulting year length being marked out on the 2729 BCE 'WOCC' reference line is 365.2415574523 days.



Diagram L29 - The original survey statue between the paws of the Sphinx.

The three resulting prime meridian lines from these calculations on the Giza plateau are shown in diagram L30.

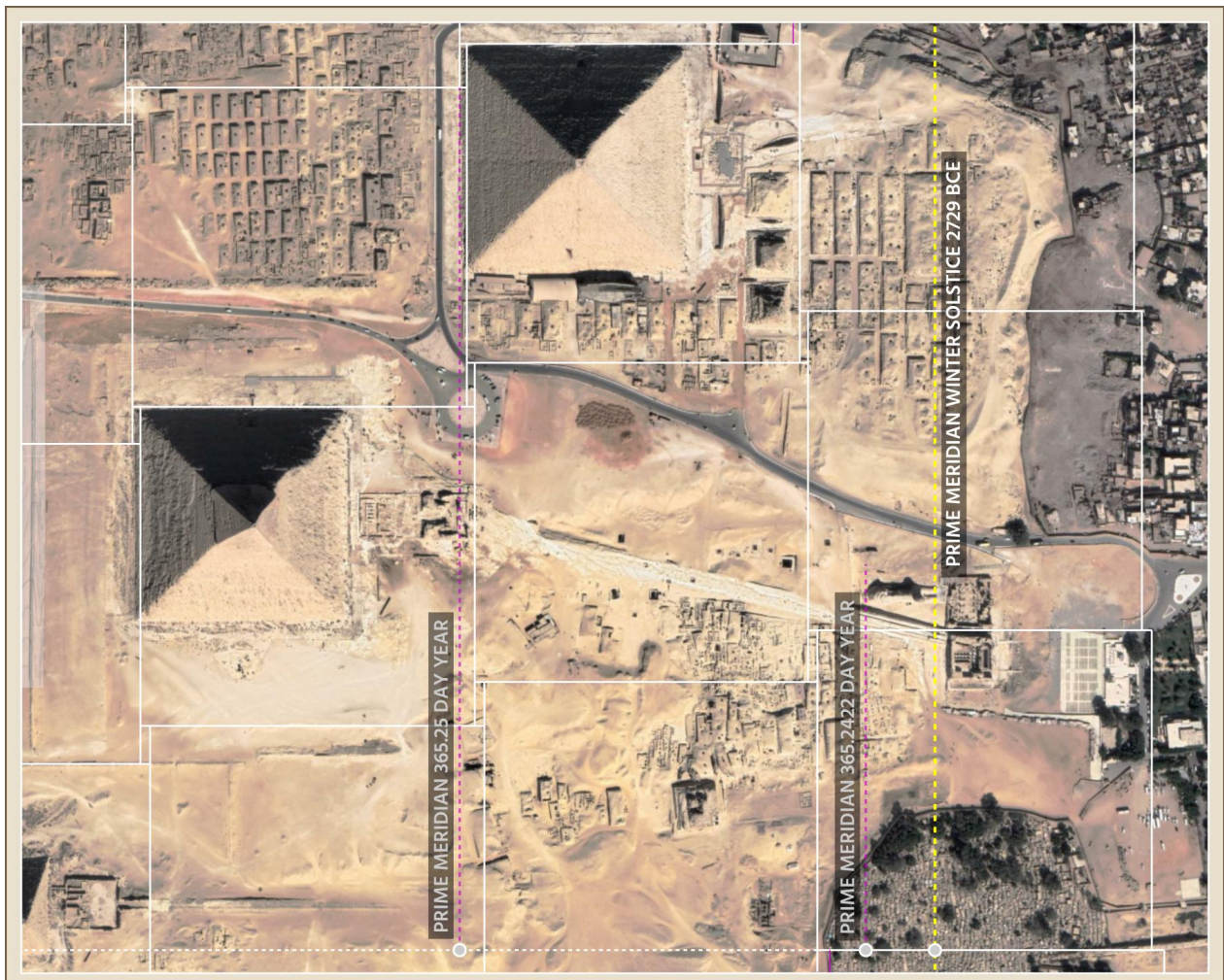


Diagram L30 - The ancient prime meridian lines on the Giza Plateau.

The longitude of the Giza prime meridian that runs through the Sphinx paw marker measured on the 26th February 2018 at 07:30 UTC was

Giza Plateau Prime Meridian 2018

31.137945970596 deg

31° 8' 16.605494" d.m.s.

The reason that the sidereal day marker 94 km to the East of Giza is positioned relative to the 365.2422 day meridian line is that this long term average day length is a known quantity whereas the prime meridian day length value, which is measured at the instant of the 2729 BCE winter solstice, will be an unknown quantity to anyone investigating the system.

Step 14

Attention can now return to the center point of the Grid system and the determination of its longitude and at this juncture the analysis becomes very unusual indeed.

Diagram L31 shows the area of the grid center point 'GPX' to the west of the wall which marks out the day lengths from the point 'WOCC'. Because the only way to determine the exact sidereal day length in 2729 BCE is to survey between the rear of the Sphinx and the unknown construction 94 km to the east of it there will necessarily be a small surveying error in the calculation because the position of the unknown structure can only be determined from GPS measurements, which include this small inherent error. For this reason the longitude of the grid center point must be positioned relative to the solar 24 hr day length point 'WOCD' and for that reason this point only is shown on diagram L31.

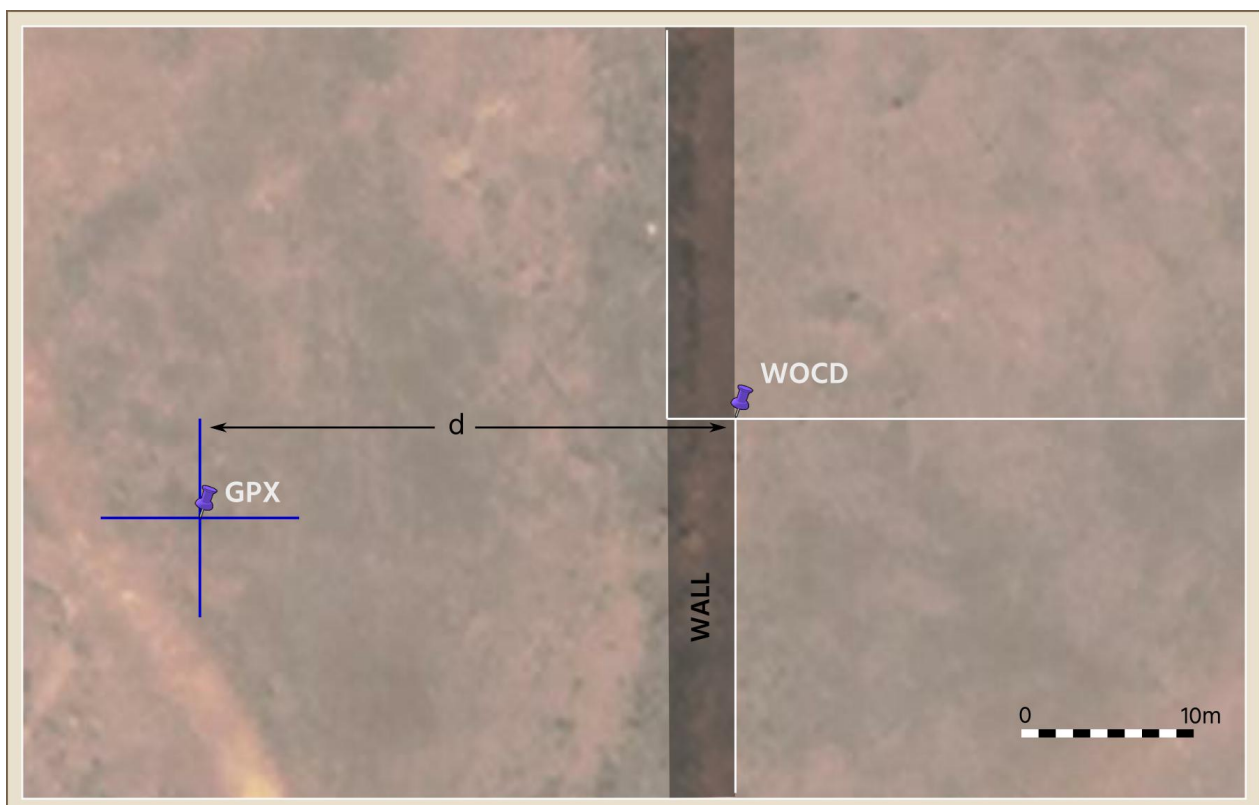


Diagram L31 - The location of the grid center point relative to the solar day length point.

The distance 'd' on the diagram is measured at the 2729 BCE latitude of the point 'WOCC' and can be determined on a geodesic calculator by entering the longitude of the points 'WOCD' and 'GPX' and calculating the distance between them.

The calculation is not difficult to perform, but is shown below in full so that it can easily be repeated and checked, because of the significance of the result.

Point 1 WOCD

2729 BCE Latitude	29.9714737221254	deg
2729 BCE Longitude	31.1249471270235	deg

Point 2 WOCD latitude, GPX longitude

2729 BCE Latitude	29.9714737221254	deg
2729 BCE Longitude	31.1246245888208	deg

Distance between the points

Distance	31.1294135174	m
Distance	31.1232955150891	pm

The conversion factor between perfect meters and meters can be found in the appendix of this paper.

The perfect meter distance between the points is instantly recognisable numerically as a longitude on the Giza plateau and is in fact a longitude only 100 meters or so to the west of the grid center point. Checking the calculation in the reverse manner, if the grid center point's longitude is used as the distance in a geodesic calculation from the point 'WOCD' to the west then the calculated longitude of the point 'GPX' differs from that of the actual grid center point by just 0.0000496 of an arc second.

How can this be possible, that the longitude *from Greenwich* of the grid center point is an integral part of the Giza plateau grid system constructed in 2729 BCE ?

If you look at the way that the longitude of the grid center point is defined by referring to table L12 earlier in this paper you can see that the value of the second part of longitude offsets in the denominator of the fraction make no difference at all to the longitude of the N.W. corner of the Great Pyramid.

If you then look at the alignment of the N.W. corner of the second pyramid in diagram L14 the longitude matches Petrie's surveying coordinate value to within a millimeter and the latitude alignment of this point with the architect's grid system contains a 40cm discrepancy. Neither the casing corner nor the platform corner are marked out, only Petrie's longitude of the casing corner.

The only conclusion that can be drawn scientifically, looking at the numerical data only and disregarding the historical context and the obviously perplexing connotations, is that the second fractional part of the longitude adjustment has been selected with the intention of creating the correct modern longitude for the center of the grid system and the longitude of the N.W. corner of the second pyramid simultaneously. The longitude offset modifier of the grid center from the N.W. corner of the Great Pyramid is six times the longitude modifier offset of the N.W. corner of second pyramid, which is a solvable mathematical equation, and therefore the alignment to the modern longitude must have been calculated.

For this to be the case then the 55th calibration pit, which contains the bent wall, is all that would need to be adjusted for the system to work. In terms of time scales, that would involve the wall being modified after the establishment of the Greenwich meridian as the accepted meridian in use around the world. The Greenwich meridian was adopted as the world prime meridian at the International Meridian Conference of 1884 that was held in Washington D.C. *one year after Petrie published his surveying data of the pyramids.*

In Petrie's work it is clear that he spent several days working with his team of local labourers and he documents the calibration pits, which he called "workman's barracks" in the main body of his book¹¹. 28

He states "Most of the excavating that I did here was only on the tops of the walls, to show their position" and in his plates at the end of the book he has the calibration pits wall sections drawn in detail to the west of the 2nd pyramid.

Diagram L32 shows Petrie's 1883 survey drawing of the pits and a 1989 survey¹² by Conard & Lehner next to each other.

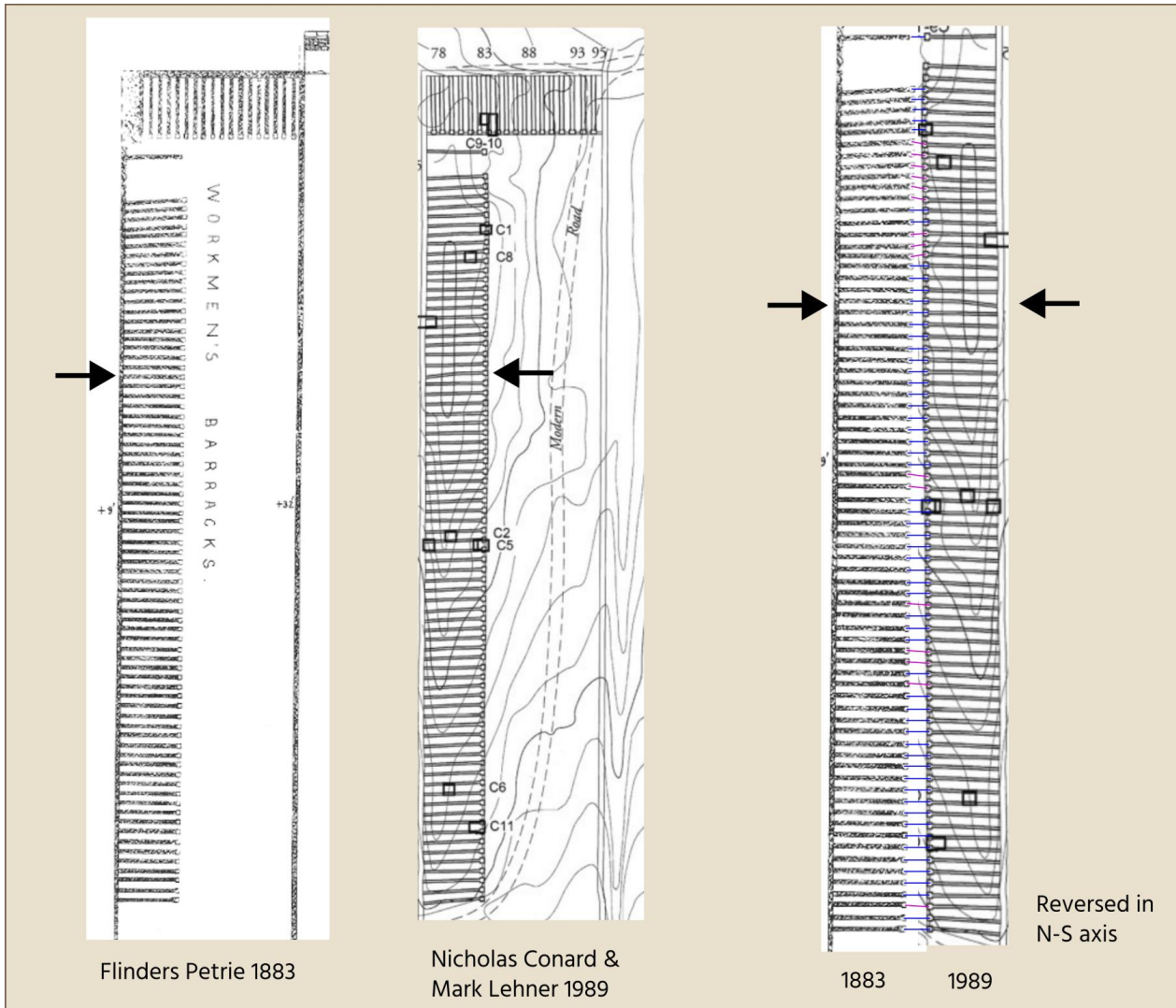


Diagram L32 - The calibration pits from Petrie and Conard/Lehner's works.

On the left of the diagram are the two survey drawings side by side, and on the right of the diagram the 1989 survey has been reversed so that the calibration pit end points can be compared between the two surveys. The pit ends are connected with coloured lines, the blue lines show a perfect correlation between the end points and the purple lines show discrepancies. Both of the surveys were carried out in the same manner by excavating the sand from the wall tops.

The pit ends of the two surveys are in close conformity indicating that both surveys have been carried out diligently and it is clear that the calibration pit wall marked with the arrows on the diagram was surveyed as running east-west by Petrie in 1883 and as being bent at 8° from east-west in 1989.

All of the scientific evidence points to the south wall top of the 55th calibration pit having been assigned its 8 degree angle sometime between 1883 and 1988. It can be concluded that the second adjustment to the longitude of the architect's surveying grid is not a part of the original 2729 BCE design and can be disregarded when formulating the 2729 BCE grid system.

Step 15

When the grid was first identified in the earlier paper⁴ in this series it was recognised that there were margins either side of the grid that needed to be added by using the monuments in Abusir as an alignment mechanism. Now that the grid has been changed into a 9x9 sub-grid system the margins are no longer valid and need recalculating. With the grid correctly formed this is a significantly easier task to perform as you do not need to leave the Giza plateau to accomplish it. Diagram L33 shows the westerly most grid in the system, number 11572 in a numbering system starting with the Giza plateau grid as number 0, counting to the west and tessellating the grids around the globe. The grid has had a 1mm margin applied to it.

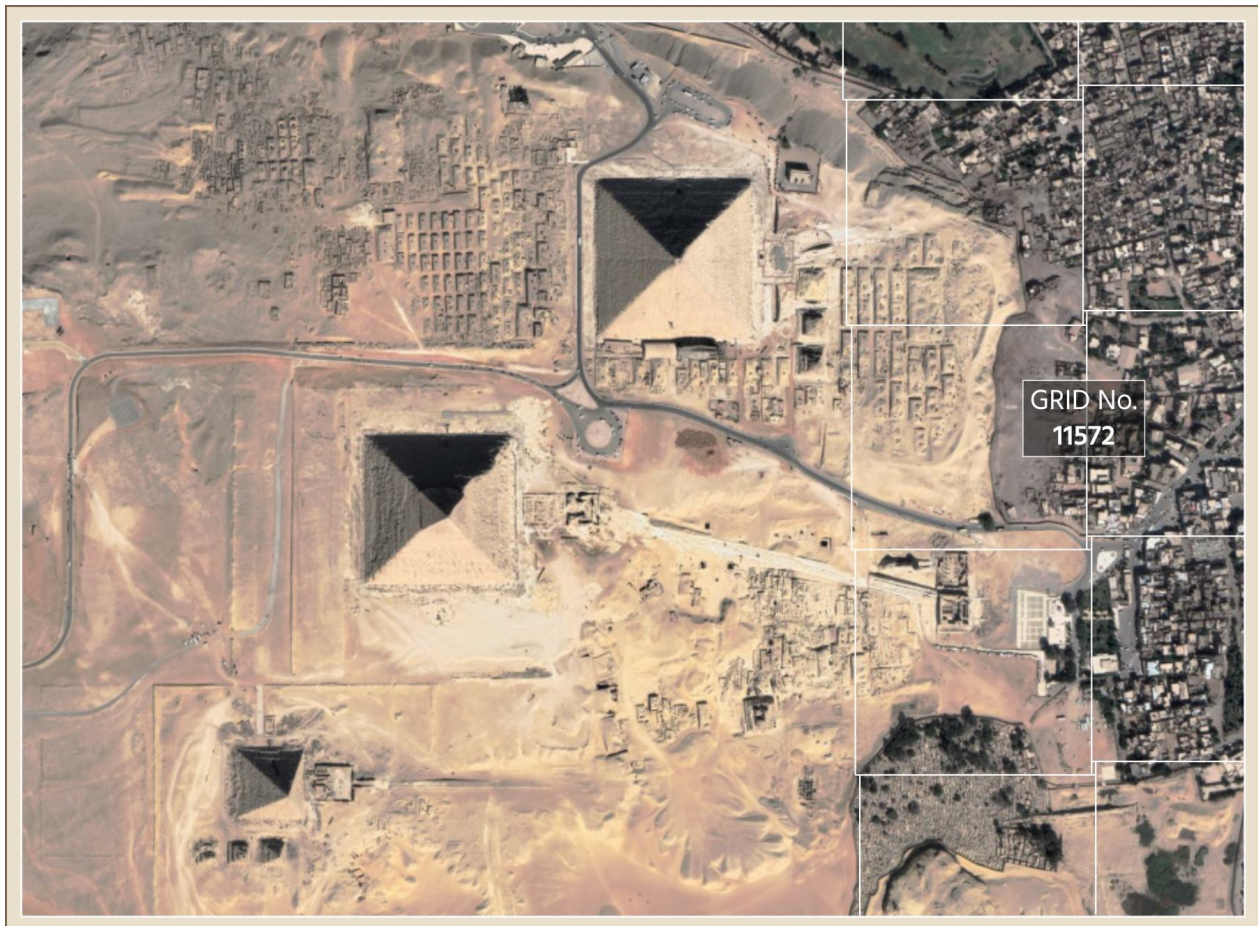


Diagram L33 - The western most grid in the tessellated system around the globe.

The longitude margin required to be added to the grids was determined by adding a 1 perfect millimeter margin on either side of the grids, plotting the results for grid number 11572, then adding a 2 perfect millimeter margin, plotting the results for the grid again and then continuing this concept. Negative margins were included in the study, in other words an overlap of each grid with the previous one, and the resulting series of west end grids was studied.

Diagram L34 shows the series of plots of grid 11572 with these different margins and is a close up of the area to the east of the Great Pyramid where there are a number of mastabas situated, as illustrated in the inset image. The dashed black longitude line shows the position of the grid's western end with no margin applied to the 11572 grids between Giza and the western end of the system. Each of the white longitude lines of the grids represent the western end of the grid with the successive 1 perfect millimeter margins applied, those to the left of the black dashed lines being positive margins and those to the east being negative margins or grid overlaps. The offset of the white lines to the black dashed line is $\frac{1}{3}$ of a perfect millimeter on the margin, that having been established during the analysis. The scale at the top of the image shows the perfect millimeter margins subdivided into $\frac{1}{3}$ rds.

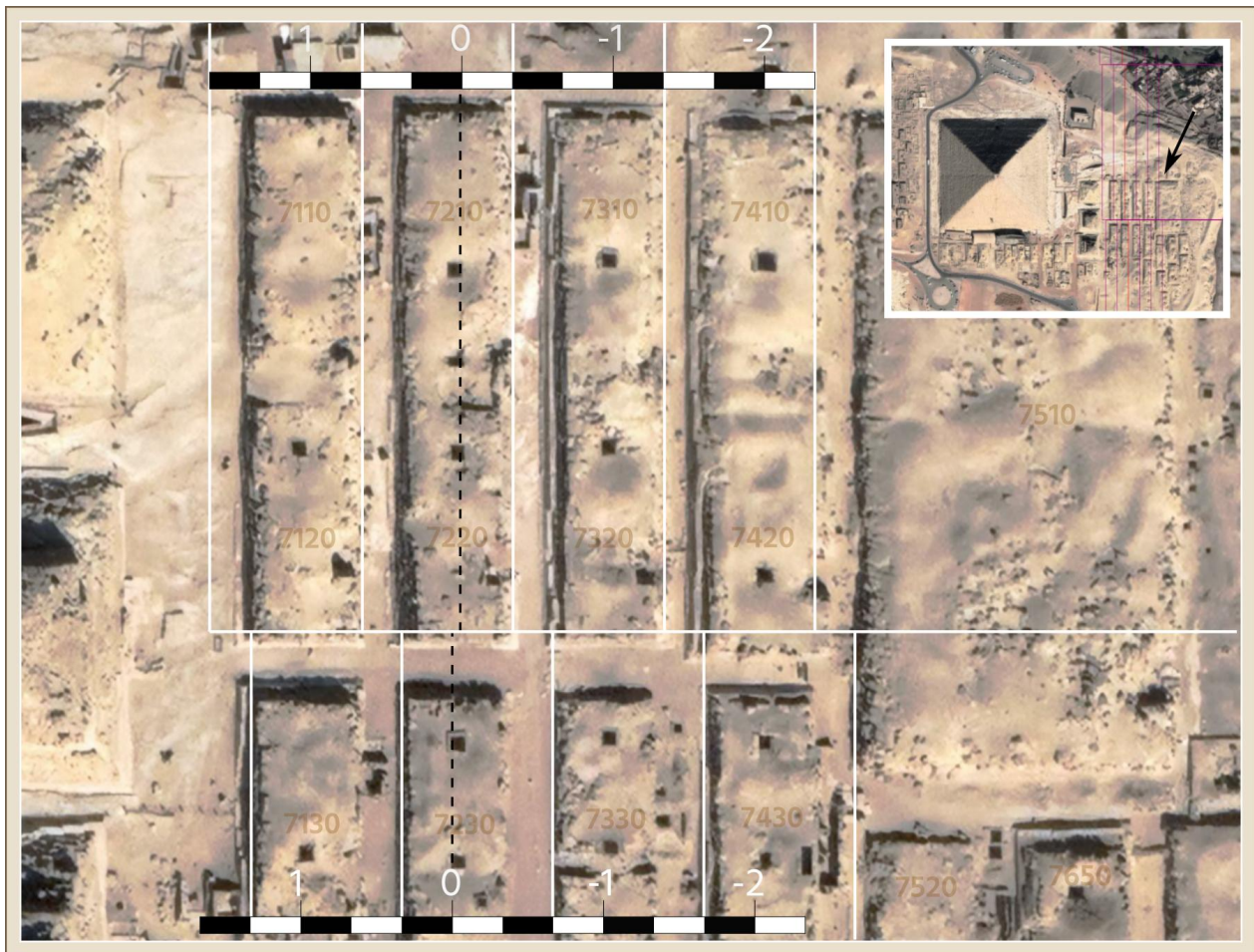


Diagram L34 - The mastabas to the east of the Great Pyramid and the grid margin alignment.

It is self evident that the north and south mastabas are constructed to align with the grid lines.

Because the large mastaba on the right of the diagram, known as mastaba 7510, has its southern side below that of the mastabas to the west of it it can be concluded that this is the reference alignment longitude for the end of the grid system and therefore the margin that needs to be applied to each grid is $-(2+1/3)$ perfect millimeters.

This value can further be refined by understanding that the first grid to the west of Giza will have only one of these margins to the east of it whereas all subsequent grids will have the two margins, west and east, of the previous grids to take into account. There are therefore 11571.5 margins to take into account when considering the final grid. A 27 perfect meter transposition of this grid to the east distributed over these 11571.5 grids would result in a margin of -0.002333319 pm, which appears to be the correct longitude margin for the grid system. As a fraction the margin is $-54 / 23143$ pm.

On diagram L34, the southern side of the fourth mastaba from the west, mastaba 7410, is deliberately set out of line to the southern side of the previous three mastabas. This is to show that the grid system requires a latitudinal offset applying to it and that the grid lines should line up with the south side of mastaba 7510 to the east.

To apply the latitude offset each 9x9 grid needs to be offset by 2 perfect millimeters to the south relative to the grid to the east of it as the system tessellates around the globe. With there being 11572 grids in the sequence then the final grid will be offset by 23.144 pm to the south and this alignment is shown in diagram L35 where the dotted lines show the grid without any latitude offset and the solid lines show the grid with the 23.144 pm offset applied.

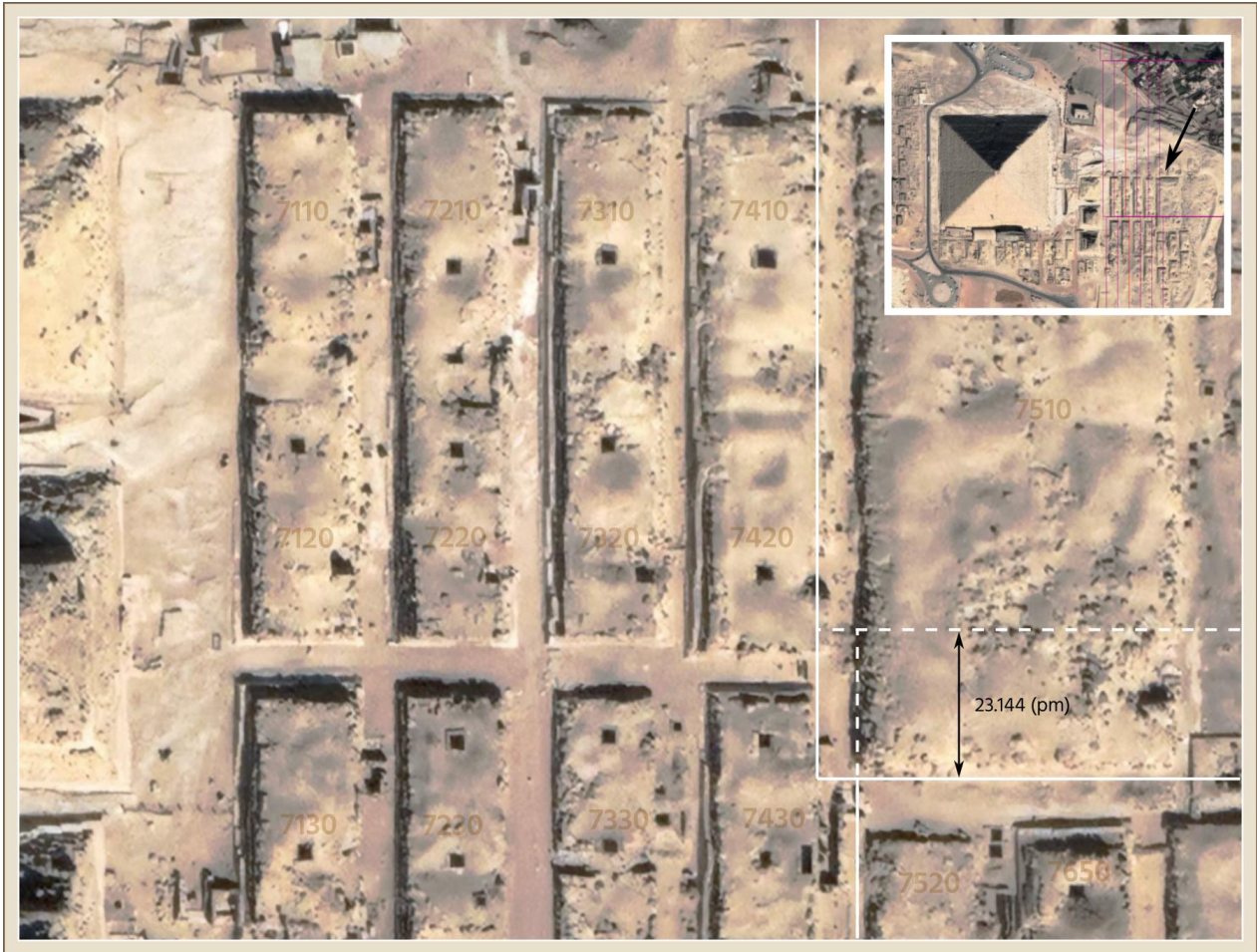


Diagram L35 - The latitude offset applied to the grid.

The 2 perfect millimeter southern latitude shift has hidden mathematics within it. At the latitude of the south of the 9x9 Giza grid a 2 perfect millimeter shift distance equates to a latitude shift of exactly -1.80×10^{-8} degrees and therefore a shift of $-\pi \times 10^{-10}$ radians which is how the shift is applied in the software that created the grid lines in diagram L35.

Diagram L36 shows the final grid, number 11572, with the longitude overlap and the latitude offset applied. The grid lines define the latitude of the central symmetry line of the Sphinx.



Diagram L36 - The latitude of the grid passing through the Sphinx.

Referring back to diagram L30 it is known that the prime meridian of the Giza plateau runs through the small obelisk like statue between the Sphinx's paws and therefore there must be one further longitude alignment required at the mastabas to bring the grid lines at the Sphinx into line with the prime meridian. Diagram L37 shows how the mastabas that have not yet been used are brought into the system and the final longitude shift that is required to the grids.



Diagram L37 - The second longitude shift at the mastabas east of GP1.

This adjustment to the longitude overlap was performed through analysis in the same manner as that of diagram L34 and both the logic of the system and the alignments to satellite photography of the plateau were used in the solution. The overlap needs to be increased from the previous $2\frac{1}{3}$ of a perfect millimeter to 3.33 perfect millimeters. The scale on the diagram shows the perfect millimeter overlap distance, the upper white longitude line passes through the 3.33 point on the scale and the black dashed line to the right of it is in line with the upper mastaba and the grid line from the grid rectangle below. Both of the walls of the upper mastabas are built to align with these grid line longitudes, and to the south of the diagram the western side of mastaba 7650 aligns with the grid longitude line that continues south off the bottom of the diagram.

Returning to the area of the Sphinx it can be seen in diagram L38 that the intersection of the grid's latitude and longitude lines now falls exactly upon the obelisk like statue between the paws of the Sphinx. The location of this point can be read off the mathematically created grid lines as being 29.9752673 deg N and 31.1379356 deg E on the 2018 adjusted version of the grid. It should be noted that this point has been created starting at the grid point 'WOCC' at the Wall of the Crow and then by traveling west 34,686.8 km around the globe to end up with a millimeter accurate location.



Diagram L38 - The final grid alignment at the location of the Sphinx.

Between the paws of the Sphinx, just in front of the body of the statue, lies an inscription stone known as "The Dream Stele" which contains the only hieroglyph inscription on the Giza plateau. In the translation of the hieroglyphs is the following:

"One of those days it came to pass that the King's Son Thothmes came, coursing at the time of mid-day, and he rested in the shadow of this Great God. Sleep seized him at the hour when the sun was in its zenith.."

The very definition of a prime meridian is that it is the location of primary longitudinal reference that is determined at midday, when the sun is at its zenith and therefore the hieroglyphic language can be directly connected to the scientific formulation of the survey grid and prime meridian.

Step 16

Remarkably the original longitude of the grid system in modern day coordinates and the direction of the tectonic plate movement of the ground since 2729 BCE can be established from the architecture. If tectonic plate movement is considered metaphorically as the continents sailing around the oceans of the world, then it is unsurprising that the boat pits that are located around the Great Pyramid are the architectural device that is used to determine this 'movement across the oceans'.

To the south of the Great Pyramid there are two rectangular pits in which the component parts of two boats were discovered in 1954. Diagram L39 shows an archaeological drawing of these two pits, which are each 32.5 x 5 meters in size. The longitudinal western end line of the east pit is the central north-south axis of the Great Pyramid.

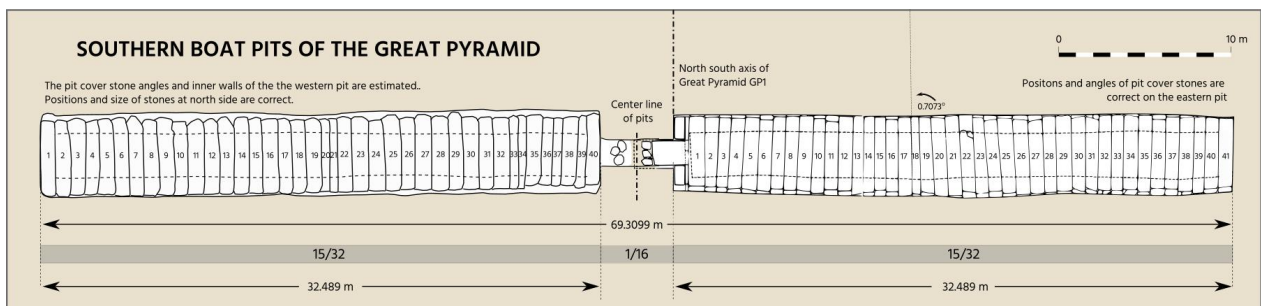


Diagram L39 - The boat pits to the south of the Great Pyramid.

These two pits were only discovered in 1954 because they were covered by a wall that ran over the top of them, and as this wall is an integral part of the solution it is shown in diagram L40.

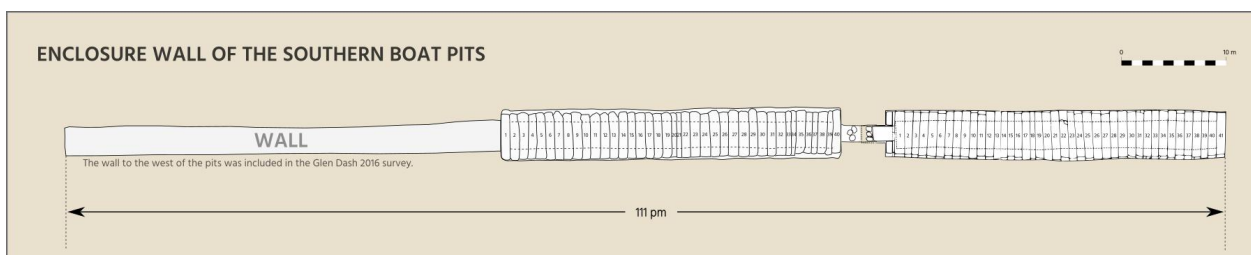


Diagram L40 - The boat pits and the covering wall to the south of the Great Pyramid.

The important part of the pits is not the two boats that were found inside them, remarkable as those are, but the series of limestone pit covers that originally concealed the pits and which were hidden under the wall as it continued to the east.

There are 41 pit covers on the eastern pit and 40 pit covers on the western pit and together they give angles to other boat pit's to the east of the Great Pyramid . The numbers of pit covers are the side lengths of a right angled triangle the hypotenuse of which runs to the north east in the approximate direction of the tectonic plate movement of the African plate. The angle is ambiguous as it could be either $\text{atan}(41/40)$ or $\text{atan}(40/41)$ which gives angles of 45.7073° and 44.2926° respectively. In the eastern pit, shown in diagram L39, there is just one narrow stone, number 18 counting from west to east, and this stone is set at an angle of 0.7073° degrees to north to help with the understanding of the construction.

To disambiguate the two angles the other boat pits to the east of the Great Pyramid need to be considered. Diagram L40 shows the two ambiguous angles plotted out from the center line on the eastern inner end of the eastern boat pit, one angle plotted from the center line of the western inner end of the western pit and the other angle plotted from the center of the western end of the wall. The diagram is a composite of a satellite image, the boat pit drawings and the ground plans¹³ of Maragioglio and Rinaldi.

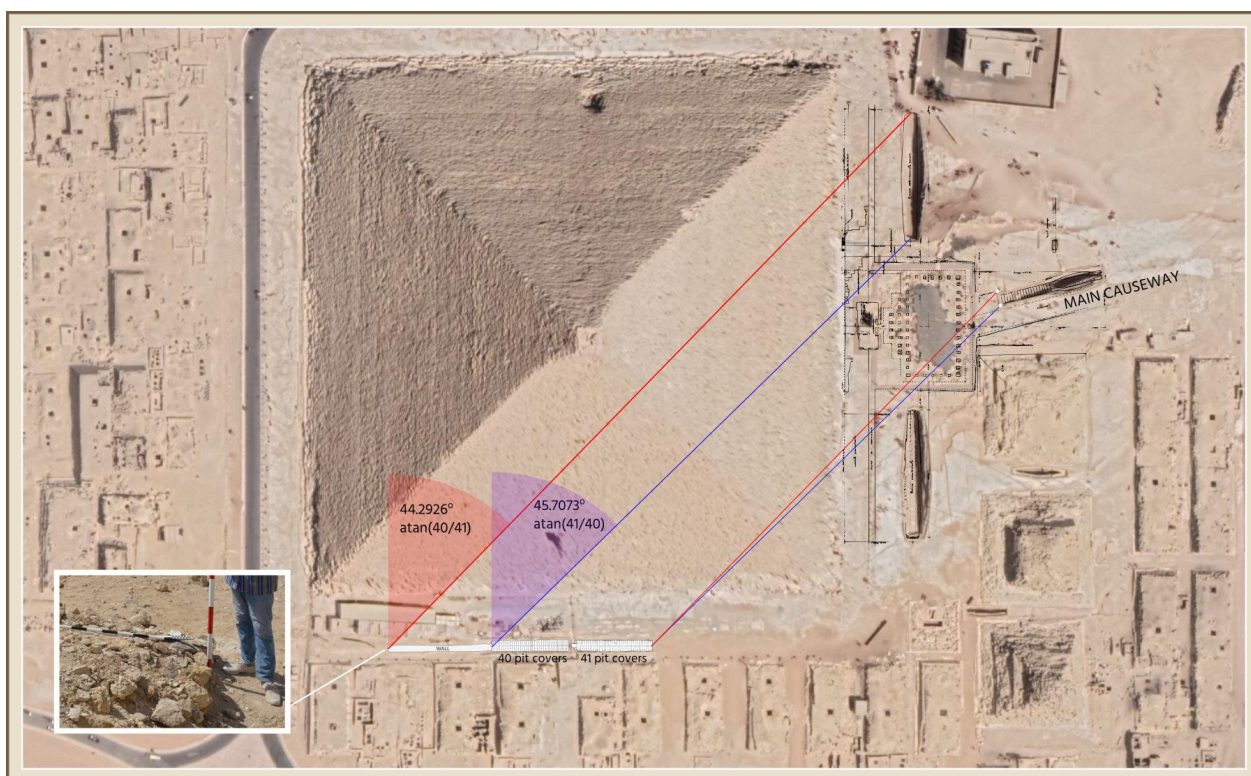


Diagram L40 - The boat pit and wall line angles.

The two lines from the east end match up with two corners of the boat pit that runs to the north of the main causeway which are marked with the white dots. The line from the western end of the western pit aligns with the northern boat pit's southern wall on the pit's center line and the line from the end of the wall aligns with the north end of the northern boat pit on the center line.

The line on the left, from the wall end, is correctly constructed but the wall cannot be taken as being a precision piece of the architecture as the inset image from the surveying of the location shows. The covered boat pits with their elaborate 20 tonne limestone covers most certainly are.

Returning to the original surveying grid, diagram L41 shows a hybrid date drawing. The white grid latitude lines are from the 2729 BCE grid and are known values, the yellow longitude lines are unknown values and are estimated, and the satellite image is a modern one from Google Earth that is time stamped at Oct. 2021 on the software and is the best geo-aligned image that is available on the application.

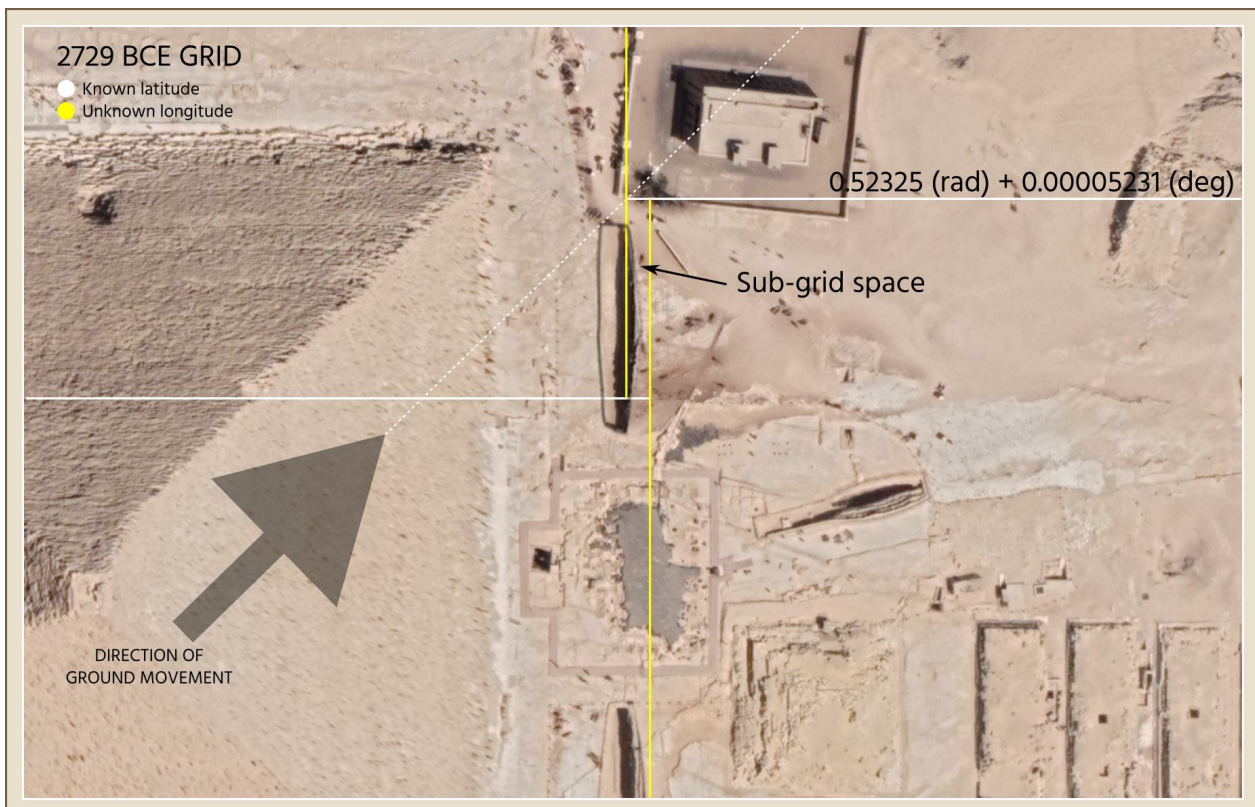


Diagram L41 - The tectonic plate movement of the plateau.

Along with the rest of the plateau, the northern boat pit is moving towards the north east and will at some point in the future align with the tall thin rectangle space between the sub-grids on the static 2729 BCE surveying grid. The tall thin rectangle space just fits inside the boat pit and is 6.06466 meters from east to west and 51.6048 from north to south.

To understand how to use this configuration the location of the northern boat pit's northern wall needs to be determined as it cannot be arbitrarily defined. Diagram L42 shows the formation geometry in which the northern wall of the boat pit is exactly 90 pm north of the vertical center point of the pyramid. A line taken from this center point 'GP1X' at an azimuth of 1 radian and ending on the latitude of the boat pit north wall defines a point on that wall. This point is given the code 'GP1BPN' as marked on the diagram and its position on the north wall of the pit is determined by using the southern boat pit plan as shown in the inset image on the diagram. The boat pit is 6.931 m from east to west at its northern end, which is exactly one tenth of the length of the southern pits that was shown on diagram L39, and therefore if the plan of the southern boat pits is placed inside this northern pit a scale is created on the northern wall.

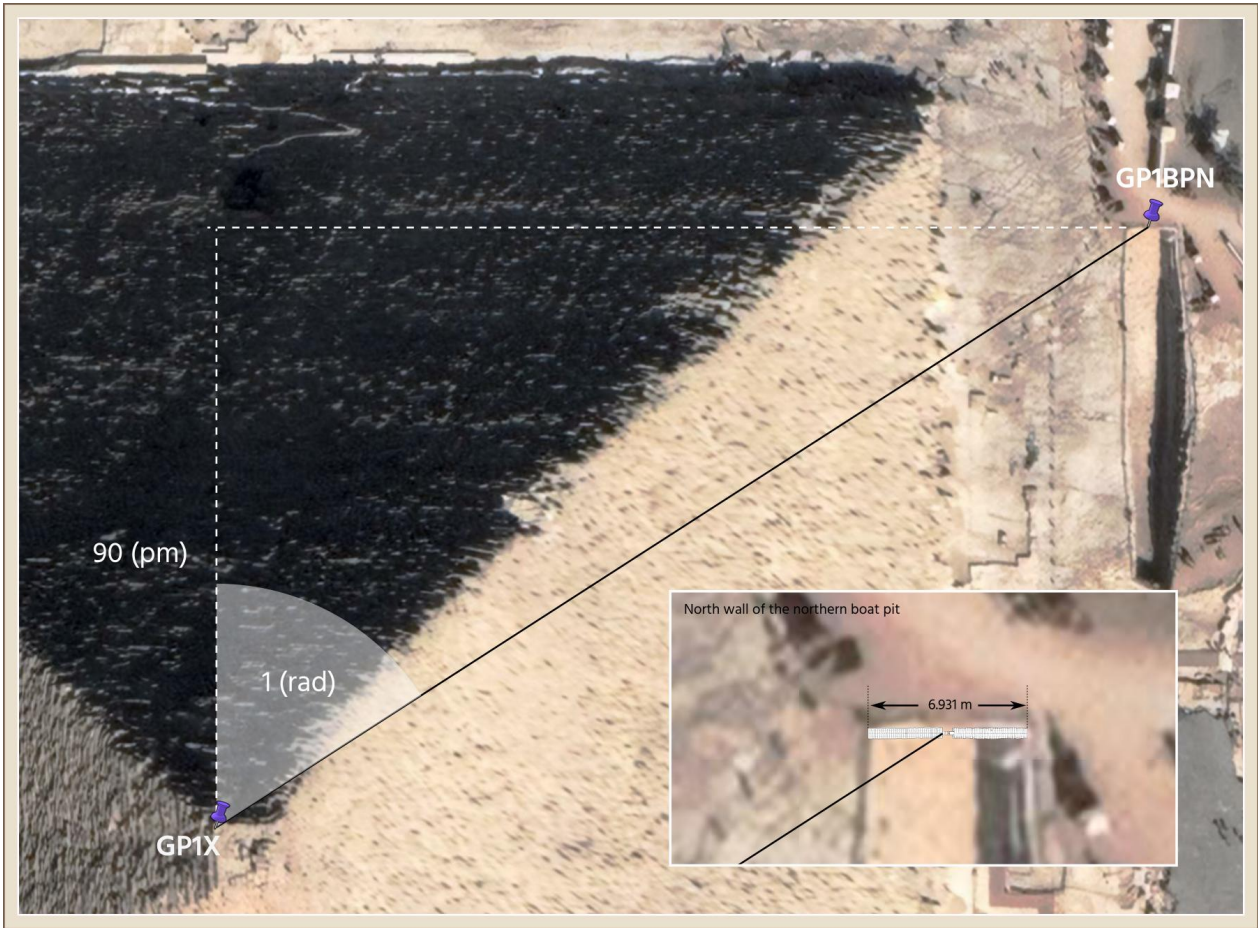


Diagram L42 - The positioning of the grid space rectangle in the northern boat pit.

Referring back to the dimensions on diagram L39 the marked point must be 15/32 of the way along the north boat pit north wall from the pit's N.W. corner and therefore the precise relative location of the pit's N.W. corner can be determined from the point 'GP1BPN'.

This pit corner point can then be connected to the matching known corner point of the 2018 grid, as shown in diagram L43, and the line connecting the two points must be the tectonic movement line of the plateau. Furthermore the point at which this line crosses the known 2729 BCE grid latitude line must be the sub-grid corner point in 2729 BCE and is marked with the code 'GPGB0SW'.

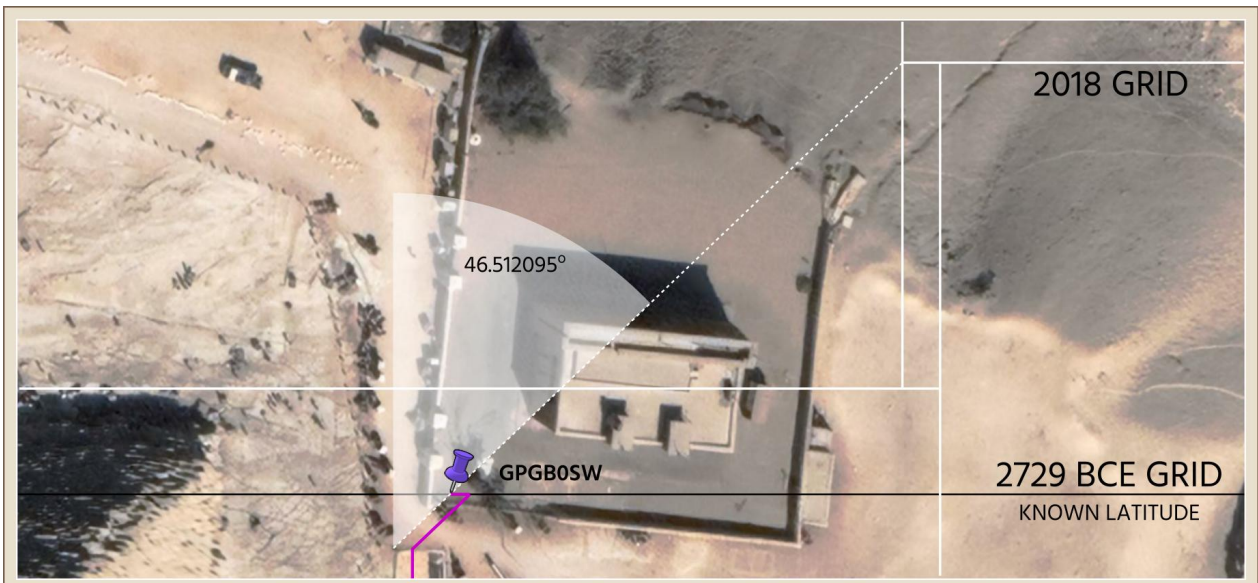


Diagram L43 - The tectonic movement line running from the boat pit to the 2018 subgrid corner.

From the foregoing data, the tectonic plate movement azimuth must be 46.5120953° .

The code that was chosen for the corner point is derived from the Giza Plateau Grid followed by the sub-grid B0 and followed by the corner point S.W..

The N.W corner point of the Great Pyramid that was defined earlier in this paper and shown in diagram L10 is located at the S.W. corner of sub-grid B1 and therefore it is possible to take a geodesic path from the point just defined 'GPGB0SW' to the known location of the N.W. corner of the pyramid in 2729 BCE and back to the point WOCC. This is the correct formation of the point at the Wall of the Crow and the definition eliminates the arbitrary line length used in step 3 in this paper and produces the final fully resolved grid system on the plateau. The path definition just explained, starting at the vertical center of the pyramid, passing through the north of the boat pit then the N.W. corner of the pyramid and finally down to the Wall of the Crow is shown on diagram L44.

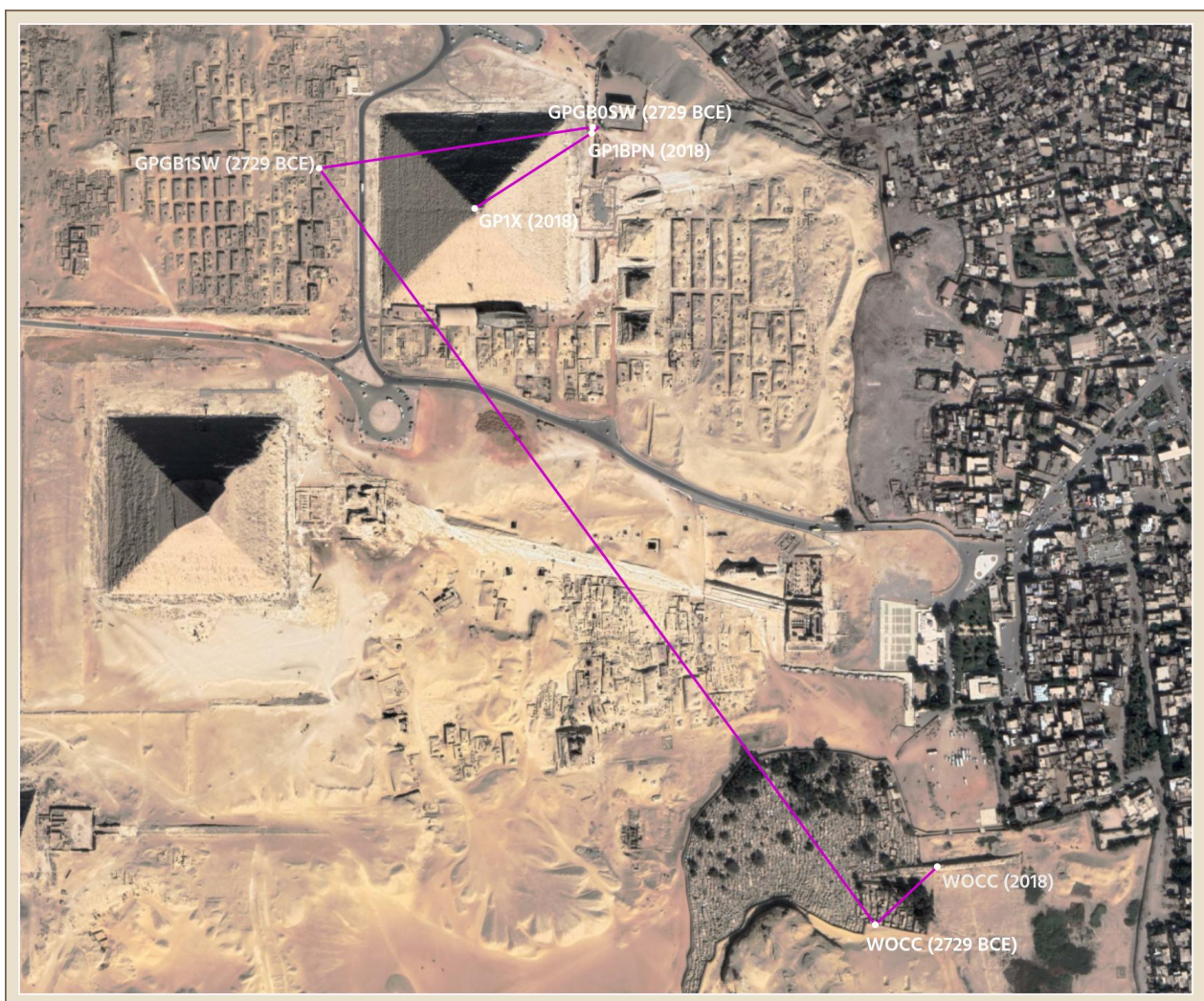
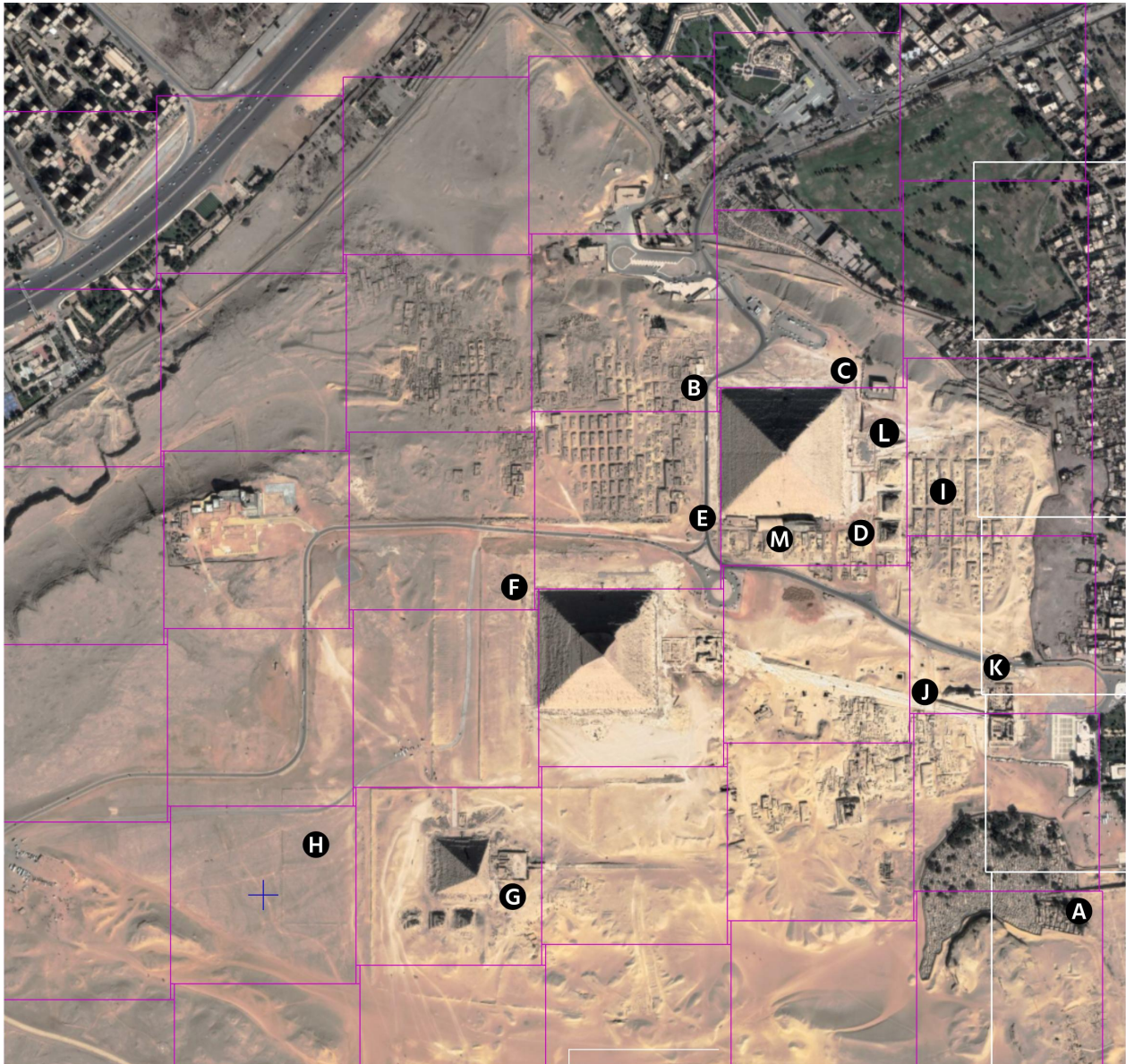


Diagram L44 - The correct formation of the point 'WOCC' at the Wall of the Crow.

The completed Giza grid

Diagram L44 shows the 2018 completed grids on the Giza plateau with grid number (0,0) shown in purple, the western end of the final grid (0,11572) shown in white and the precise geometrically created correlation points from the two grids marked with letters.



RESOLVED PLATEAU LOCATIONS

A The Wall of the Crow passage	F Longitude of the north west corner of GP2	K The longitude of the Giza prime meridian
B GP1 north west corner casing platform and socket corners	G Latitude of the south face of GP3	L The northern boat pit to the east of GP1
C GP1 north east corner casing platform and socket corners	H The wall positions to the west of GP3	M The southern boat pits of the Great Pyramid
D GP1 souther east corner casing platform and socket corners	I The mastabas to the east of GP1	
E GP1 south west corner casing platform and socket corners	J The latitude of the center line of the Sphinx	

Diagram L44 - The completed original Giza plateau surveying grid, world grid number (0,0).

Step 17

The grid system shown in diagram L44 is correct in every detail but is only the foundation for a more complex construction which involves the grid being rotated as it tessellates around the globe. The key to unlocking the full grid system with inherent rotations is, as you would expect, particularly well hidden and to find it you first have to find the hidden second Sphinx.

Egyptologists have always been slightly baffled by the fact that there is only one Sphinx present on the Giza plateau because the Sphinx represents duality in the ancient hieroglyphic texts that have been translated and as a consequence the Sphinx statues always appear in pairs.

Diagram L45 shows the location of the second Sphinx of Giza with the scaled up image overlay of Mark Lehner's archaeological map superimposed on the ground features on the left side of the diagram, and the satellite image of the area shown on the right side of the diagram.

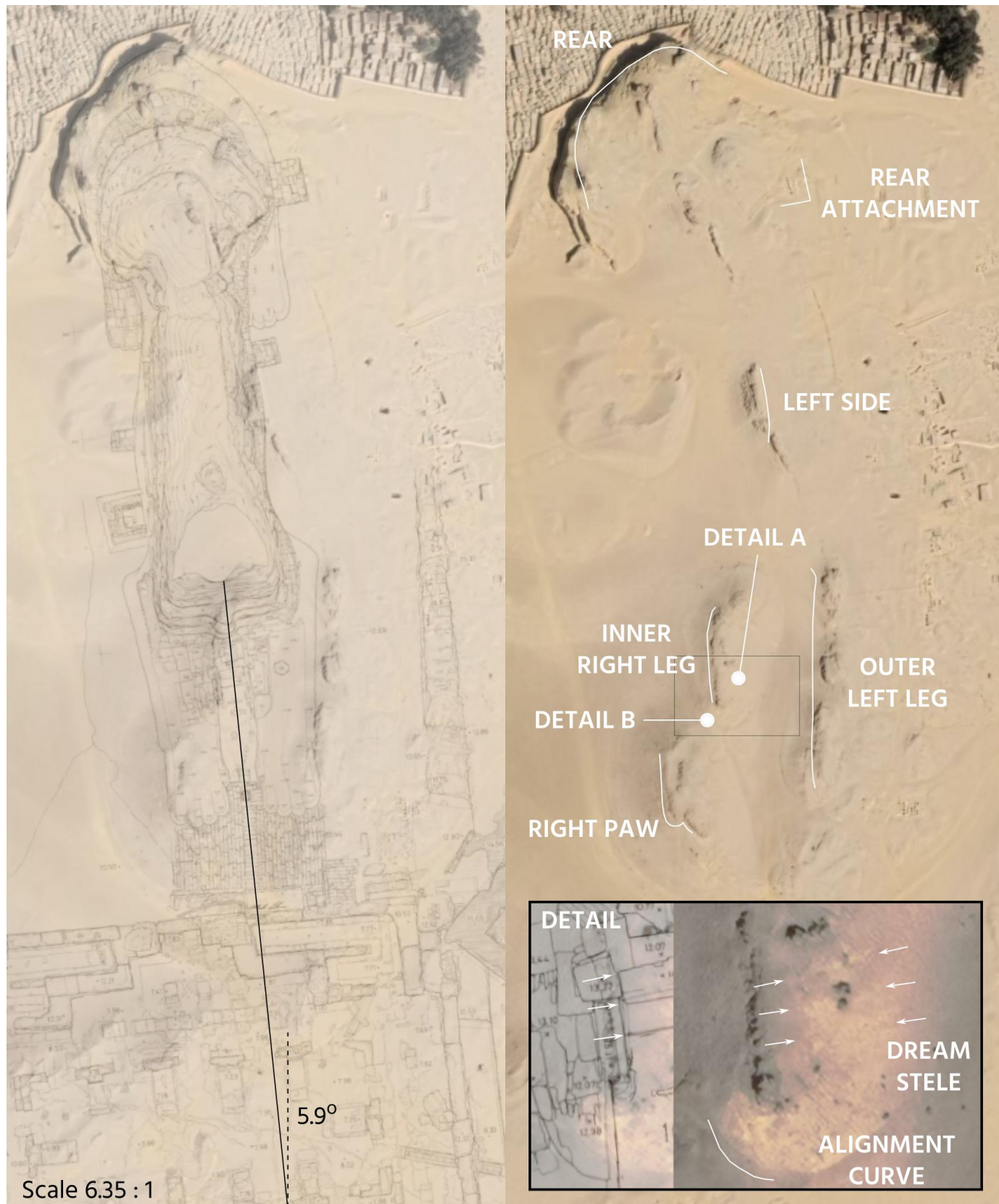


Diagram L45 - The second Sphinx at Giza.

The second Sphinx was discovered during the study of the rear section of the main Sphinx shown in diagram L28 where it became quite obvious that the raised ground section to the south of the cemetery on the southern side of the Giza plateau bore a striking resemblance to the topography of the rear of the Sphinx statue. There are numerous ground features on the second Sphinx which correctly tie it in to the known statue of the Sphinx, eight of which are shown in diagram L45.

Of particular note are the details shown in the inset image where it can be clearly seen that the "Dream Stele" hieroglyph plaque that sits at the heart of the Sphinx statue is visible in the sand with distinct straight lines showing their profile through the sand covering. It may well be that what is hidden here is simply a cutting of the bedrock to emulate the position and line of the stele, but it could also be finely detailed workmanship. Only archaeological excavation of the area will answer that question.

The scale of the second Sphinx is about 6.4 : 1 although at this stage in the analysis the only way to determine this value is to align to the hidden ground features and so the value should be considered as being approximate until a better method of alignment is found.

The question that needs to be answered regarding the second Sphinx is why it is angled at an azimuth of -5.9 degrees. Because the primary Sphinx provides the alignment for the last piece of the grid system, grid number (0,11572), it can be correctly deduced that the second Sphinx also serves this purpose and that the angle being displayed on the second Sphinx model is also that of the grid system, which must therefore require a rotation applying to each subsequent grid in the system. Consideration of the pieces of the whole puzzle up to this point indicate that if a rotation is applied to the grid so that the grid rotates through a multiple of 360 deg during one sidereal day, then at the prime meridian of the solar day in Giza the grid will be over-rotated past the 360 deg point and line up with the axis of the second Sphinx. This would require the rotation to be applied in an anti-clockwise direction.

The number of required rotations in a sidereal day can be calculated from the data already used in this paper when investigating the walls to the west of the third pyramid: that the sidereal day marker point is 0.9832924 degrees to the East of the main Sphinx statue. If the basic grid was to undergo one rotation in a sidereal day then the final grid in the system would be over-rotated by 0.98599 degrees at Giza. From this it can be seen that if the grid is rotated 6 times in a sidereal day then the over rotation at Giza would be 5.9 deg and would align with the second Sphinx's primary axis. This is exactly the system that has been used and diagram L46 shows the grid rotations due to latitude overlaid on a world map.



Diagram L46 - The grid rotation as a function of latitude from Giza

There are 11573 complete grids in the system from the prime meridian at Giza back to the Giza plateau and each successive grid is rotated anti-clockwise by 0.17205939 degrees relative to the previous one to the east of it. Diagram L47 shows grid number (0,11573) drawn on top of the second Sphinx with the image overlay from Mark Lehner's archaeological map of the Sphinx and the associated temples scaled up by 6.3492:1.



Diagram L47 - The grid rotation of grid (0,11573) and its alignment with the second Sphinx's axis and temples.

Not only does the grid align with the axis of the second Sphinx but it also quite clearly defines the northern wall of the Sphinx temple and the southern limit of the forecourt of the temple entrance area. Note that on the right side of the diagram the incongruous rectangular temple structure looks highly out of place, and that the gap between the sub-grids is similar to the side chamber of this temple marked with arrows. The grid and this temple are associated with each other and need to be aligned. Before this can be done, it is best to finish the primary angular rotation system and return to this side temple afterwards.

If the grid rotates as a function of longitude then it should also rotate as a function of latitude. This can be tested by finding the point on the equator where the sidereal day meridian is, as opposed to the sidereal day meridian at the latitude of Giza, which is already marked out. The latitude of the point is the equator, and the longitude is again 0.9832924 degrees to the East of the main Sphinx statue marker which is located at 31.137936 degrees, giving the sidereal day point at 32.121228 degrees East.

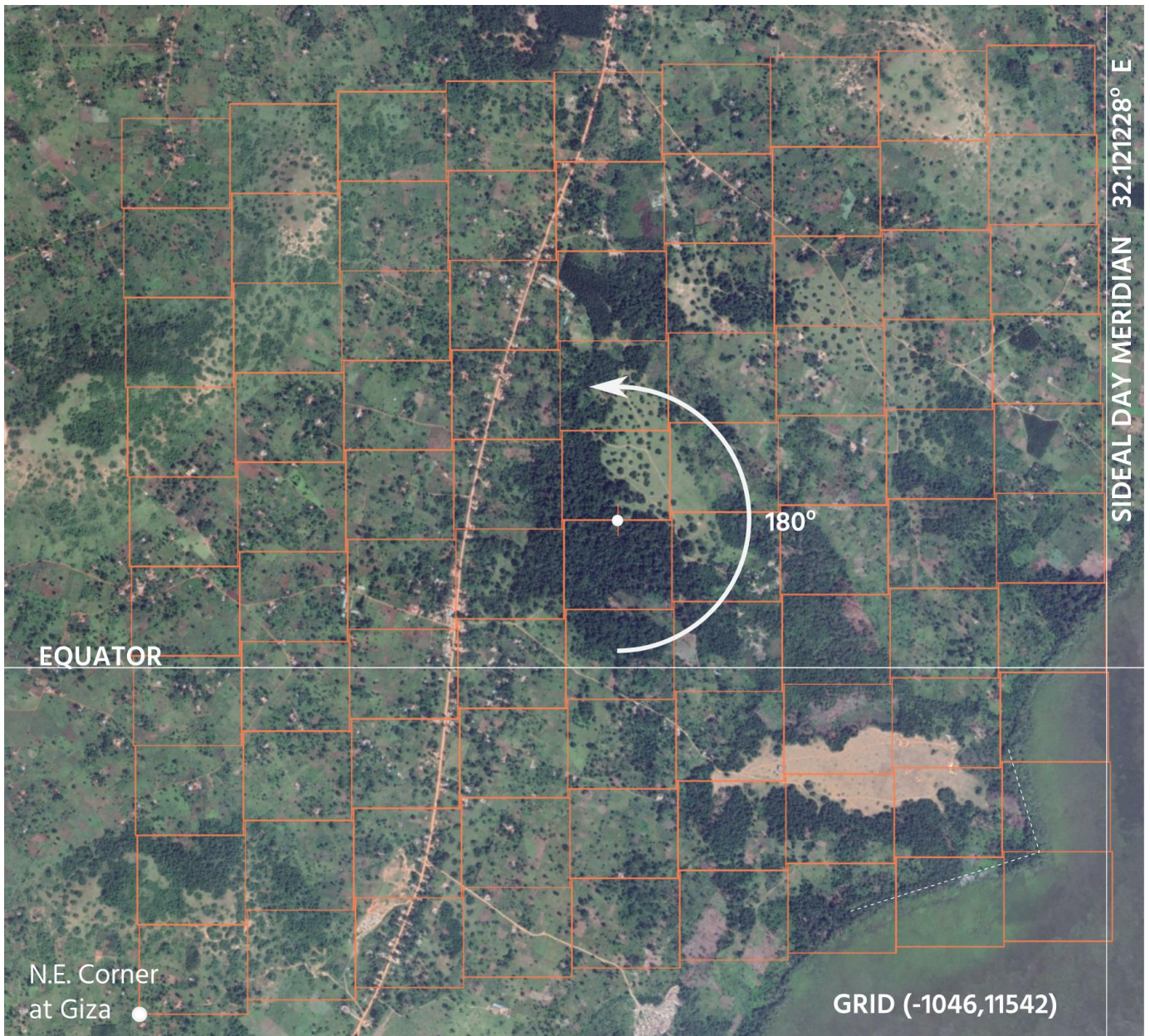


Diagram L48 - The grid rotation in latitude at the sidereal day marker on the equator.

Diagram L48 shows the grid plotted over the sidereal day meridian on the equator in the country of Uganda. After thorough investigation of this alignment and the preceding information in this paper it was determined that each grid in the system needs to be made up of a 10 x 9 sub grid. With this established, the rotation that has been applied to the grids from Giza south to the equator is the ingeniously perfect and simple value of $1 / 333$ radians per grid. The grid is number 1046 in latitude south from Giza and the rotation of the grid is that of half a circle and so, correctly, $1046 / 333 = \pi$.

If you check the architect's mathematics you will find that there is a small error of 4 parts in 10,000 in that calculation.

This is deliberate because the rotation of the grid is dependent upon two values, latitude and longitude and if the grid rotation is to be fully calibrated then one of these two values needs to be a fixed constant. That fixed constant is the latitude rotation component of $1/333$ radians per grid, allowing the longitude rotation to be adjusted by varying the longitude margin on each grid. The result of increasing the longitude margin is to shift the grids further apart east to west, which results in the position of the Uganda grid moving west slightly, which results in more rotation being applied to the grid. The adjustment to the longitude margin can be refined until the point is reached where the Uganda grid is perfectly aligned east to west but this needs to be done once the grid's creation system has been finished, which is not yet the case.

Looking again at the side temple of the second Sphinx in diagram L47 it is clear that the grid cannot be rotated into position in order to form this temple, but the temple is also quite clearly part of the grid system. The only possible manner in which this temple can be formed is if there is a second grid structure which is identical to the first and which is pivoted at one of the nodes of the sub grid.

This hypothesis was thoroughly investigated and the software that had been written to form the grids was ammended so that a second grid could be created on top of the first and pivoted at any node within the original grid. The rotation parameters of this grid were discovered by attempting to align the second grid to the side temple and after significant time it was concluded that the manner in which the second grid rotated was that it performed a -360 degree rotation when it was moved from the east side of the main grid to the west side along the grid nodes. Because there are 9 sub grids from east to west that meant that for each sub grid moved to the west the seond grid would rotate by -40 degrees, the minus sign indicating that it is rotating in the opposite direction, clockwise, to the main grid's rotation.

During the process of investigation it became apparent that each sub grid must contain another grid within it, as was first identified in the earlier paper on this subject⁴, and the resulting closest fit alignment for the side temple is shown in diagram L49.

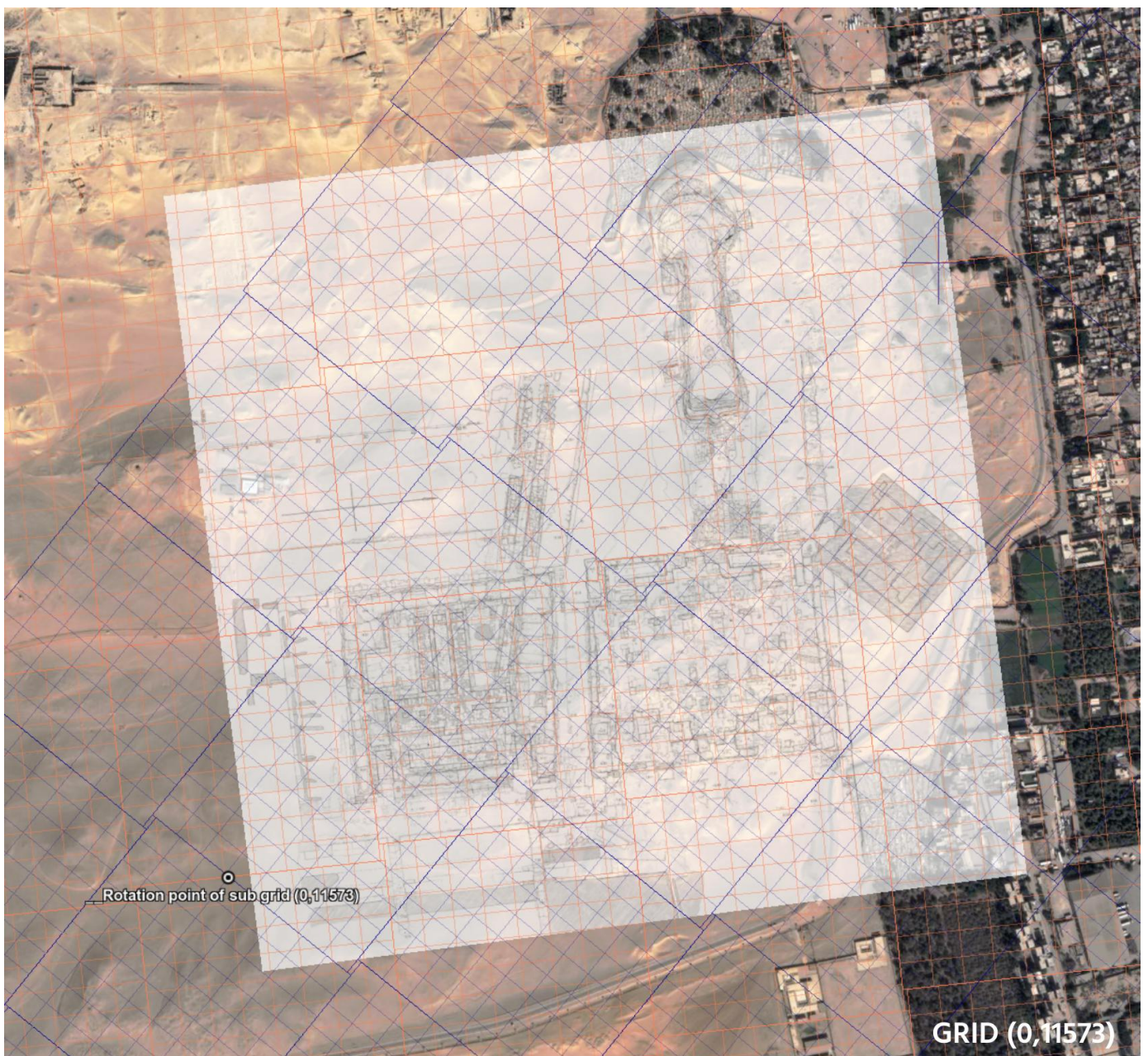


Diagram L49 - The closest fit of the Sphinx side temple to the grid.

In diagram L49 the orange grid is the main grid number (0,11573) angled at 5.9 degrees. The bold orange lines mark out the 10x9 sub grid and the feinter orange lines are a 9x8 mini grid formed inside each sub grid. The blue lines are the second grid which is pivoted around the rotation point that is shown on the diagram. The rotation angle has been calculated from the rotation point's location on the main grid by applying a -360 degree rotation *both across the grid and down the grid* meaning that it is possible to apply a maximum of 720 degrees rotation to the grid if the south west corner of the main orange grid is used as the rotation point. The detail of the side temple alignment is shown in diagram L50.

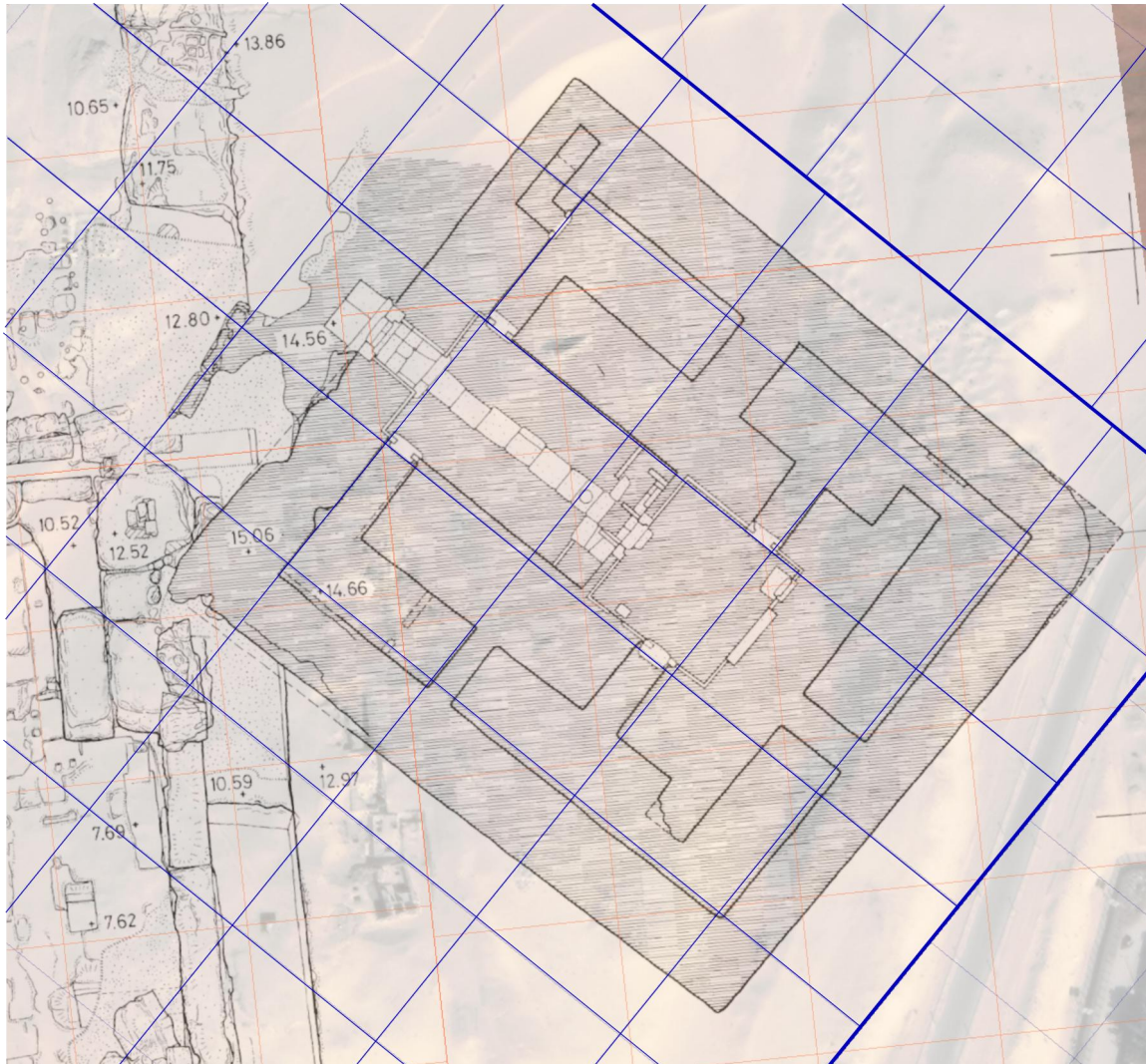


Diagram L50 - The detail of the closest fit of the Sphinx side temple to the grid.

Diagram L50 is one of several 'close fits' that can be formed with the second grid and whilst it is clear that a number of features within the temple can be discerned on the grid structure the alignment is not correct. The same was true of all of the other close fits and after a countless amount of time working on this I came to the conclusion that it would not be possible to get the grid system to fit to the temple. The point of note that stood out in the side temple was the eastern rounded corner which strongly suggests that the grid should align to this corner with the intention of completing the temple and repairing the corner.

What I did not realise is that I had just created all of the formation grid geometry that is required to solve the design of the Unfinished Pyramid of Zawiyet El-Aryan which is located 3km to the south of Giza and which is the first of the many pyramids that can be found along the northern section of the Nile valley.

Step 18

The Unfinished Pyramid of Zawiyet El-Aryan is exactly as its name suggests incomplete and consists of a massive foundation hole in the ground and an ornate floor structure within it. It can be found in what is 45

now a military compound and it was discovered in 1900 by an Italian man named Alexandre Barsanti who, unfortunately, completely vandalised the location. Fortunately he did write up his escapades in a book and so details of the dimensions and state of the area when he found it are available.

Diagram L51 shows the main grid number (-1,11573) draw over the Barsanti's scaled plan of the Unfinished Pyramid which is then superimposed upon a satellite image.

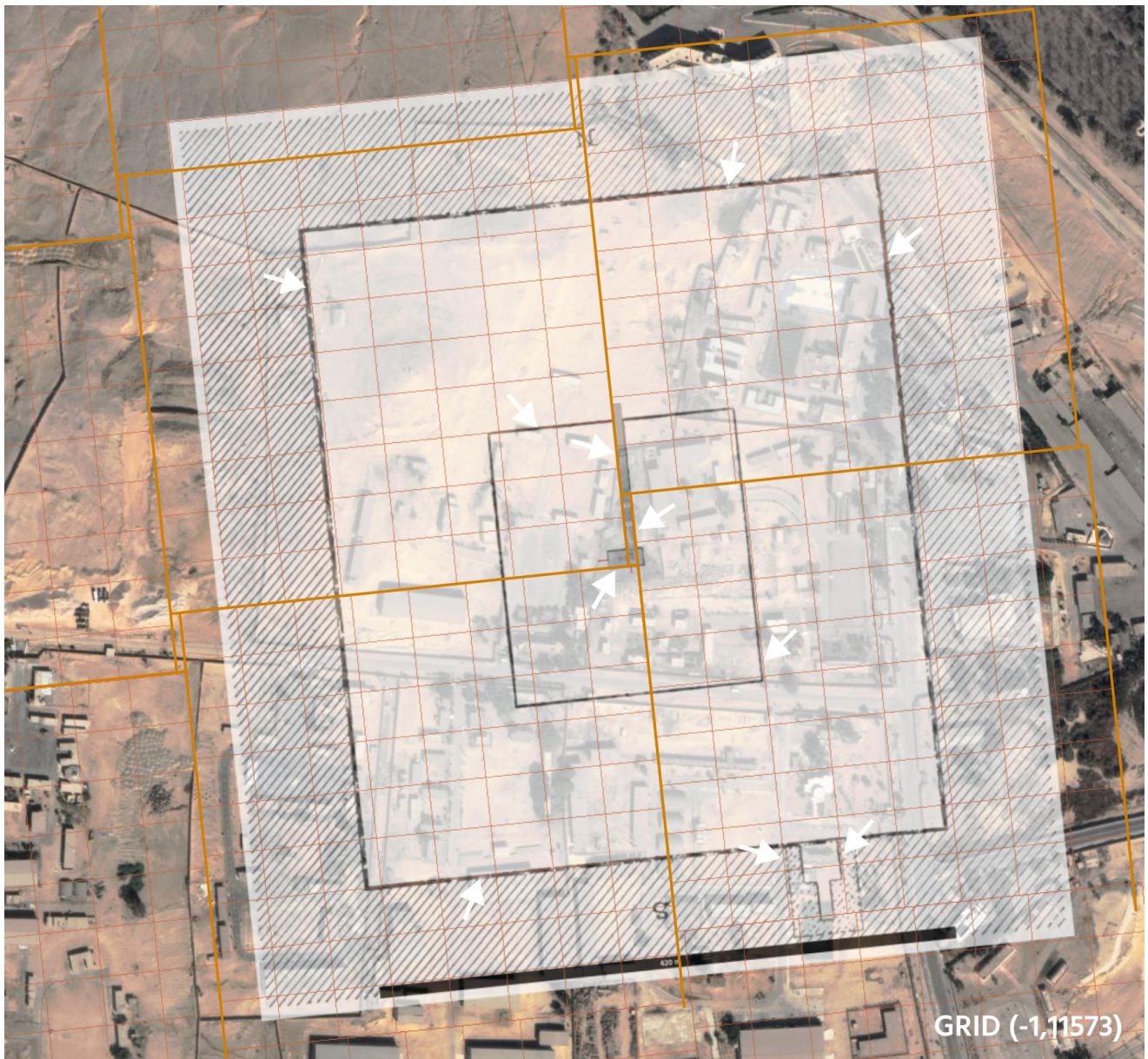


Diagram L51 - The Unfinished Pyramid of Zawiyet El-Aryan and the grid system.

The grid has been adjusted from the one which fits to the statue between the Sphinx's paws using the same technique that was used for that first alignment, namely to add to the longitude margin and to the latitude drop between grids, so that the gap between the sub grids aligns with the southern wall of the Unfinished pyramid's pit and also with the ramp's side walls.

It is now possible to look a lot closer at the ramp and pit area and deduce that there is another grid that needs to be formed inside the mini grid that produces the finer details of the pit structure. This micro grid is shown in diagram L52 in which the perfect alignments of the pit floor of the pyramid can be seen. The micro grid is a 12x9 grid structure which can be deduced by looking at the bottom of the pit's dimensions which match the micro grid's layout at this location and in particular the marks shown in red on the diagram which is where the walls of the pit have large white plaster lines running down them with builder's red paint lines in their center. The lines define the micro grid divisions.



Diagram L52 - The details of the micro grid and the pit at Zawiyet's unfinished pyramid.

Step 19

Having solved the layout of the Unfinished pyramid it is now necessary to return to the Giza plateau to find the next part of the system's detail. Diagram L53 shows the 'drainage ditches' to the north west of the Great Pyramid with the green survey markers of the Glen Dash team displayed on the satellite image.

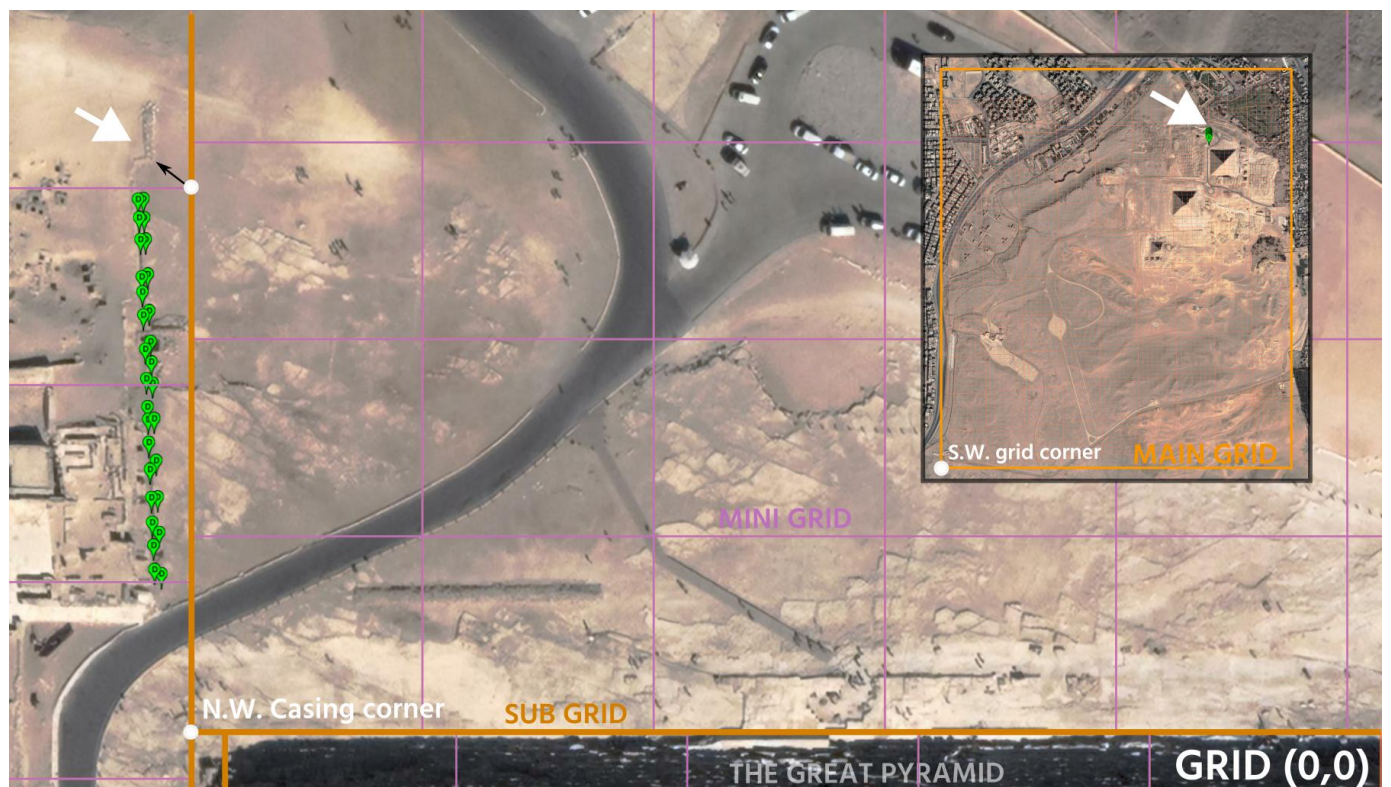


Diagram L53 - The drainage ditch to the N.W. of the Great Pyramid.

If you consider the drainage ditch, which is in fact an angular rotation calibration ditch, its small angular rotation from north and the distinct corner at the top of the ditch highlighted with the white arrow, and then consider where this is located on the main grid (shown in the inset image) it is evident that the main grid needs to undergo a rotation to align with the ditch corner. The small black arrow shows the direction of the movement of the grid node that is required for it to fall on the ditch corner and the perpendicular to this arrow runs through the S.W. corner of the main grid, which must therefore be the pivot point of the rotation.

The main grid is number (0,0), the very first grid, which by definition runs north-south and east-west and has no rotation applied to it and which has its defining point as the N.W. casing corner of the Great Pyramid. This is only one logical system that can be in operation here.

The grid to the west of this grid, number (1,0), is known to have an angular rotation applied to it of 0.17205939 degrees shown in diagrams L46 and L47 and therefore as you move from east to west across any given grid this angular rotation is applied incrementally to the grid. At the east side of the grid only the rotation due to the longitude position of the grid is applied and when you reach the west side of the grid the full 0.17205939 degree rotation will have been applied to the grid and you can then move seamlessly on to the next grid to the west. Because there is also a rotation related to the latitude of each successive grid of $1/333$ radians the same system is in operation as you travel down a grid. At the north of the grid only the rotation due to the longitude position is applied and then the incremental rotation is applied the further down the grid you go until, at the south of the grid, the full $1/333$ radians rotation will have been applied.

The only problem with this system is that on the first grid, if you were to select the defining N.W. corner of the Great Pyramid as your chosen sub grid node, then the whole grid would need to have rotations applied to it and the grid lines would no longer align to the cardinal points, which we know they must. This can be correctly rectified by adding a rotation offset to the grid to compensate for this main reference point being located at the N.W. corner of the great pyramid. The sub grid pattern is a 10 x 9 grid and the N.W. corner of the Great Pyramid is at the S.W. corner of sub grid (1,1), counting from zero, and therefore the offset of the N.E. corner of the grid will be $2/10 \times 1/333$ radians in latitude and $2/9 \times 0.17205939$ degrees in longitude.



Diagram L54 - The correctly rotated grid and the match to the calibration ditch.

These additions to the computer software were programmed and diagram L54 shows the subsequent rotation applied to the grid when the S.W. corner of the main grid is selected as the grid node, where both the latitude *and* longitude rotations have therefore been applied to the grid. On diagram L54 the grid number code has been enhanced with the node details which are now essential when naming the grid so that the correct sub grid node can be identified. The coding system has the sub grid row and column first 'J8' then the mini grid row and column '87' then the micro grid row and column 'B8' in hexadecimal format, and finally the vertex of the micro grid 'SW'.

The rotation calibration ditch corner now slots neatly into the grid system, as can be seen in the diagram, and the ditch line now aligns with the sub grid corner. If you compare the Great Pyramid's north face line on diagram L53 to that on diagram L54 you can see the grid rotation most clearly. The azimuth of the ditch line, shown with the dotted white line in diagram L54, is 16 times the rotation of the main grid in latitude, or 2.753 degrees, designed so that it can be identified as a part of the grid rotation system.

Step 20

It is only after the primary grid rotation system has been fully resolved that the rotation of the second grid upon the first can be understood because the second grid pivots on the grid nodes of the first grid and therefore needs to use the same offset rotation system as the first grid so that the initial grid in Giza with its node on the N.W. corner of the Great Pyramid is correctly aligned north south. The offsets of the second grid rotation are calculated in the same manner as the first with the only difference being that the second grid undergoes a full 360 degree rotation as the grid node point passes from the east of a main grid to the west, and the same from the north to the south. The rotation offsets on the second grid are therefore $2/10 \times 360$ degrees in latitude and $2/9 \times 360$ degrees in longitude.

Diagram L55 shows the primary grid with the N.E. corner of the grid selected as the grid node and the dramatic starting location of the secondary grid due to the offsets shown.

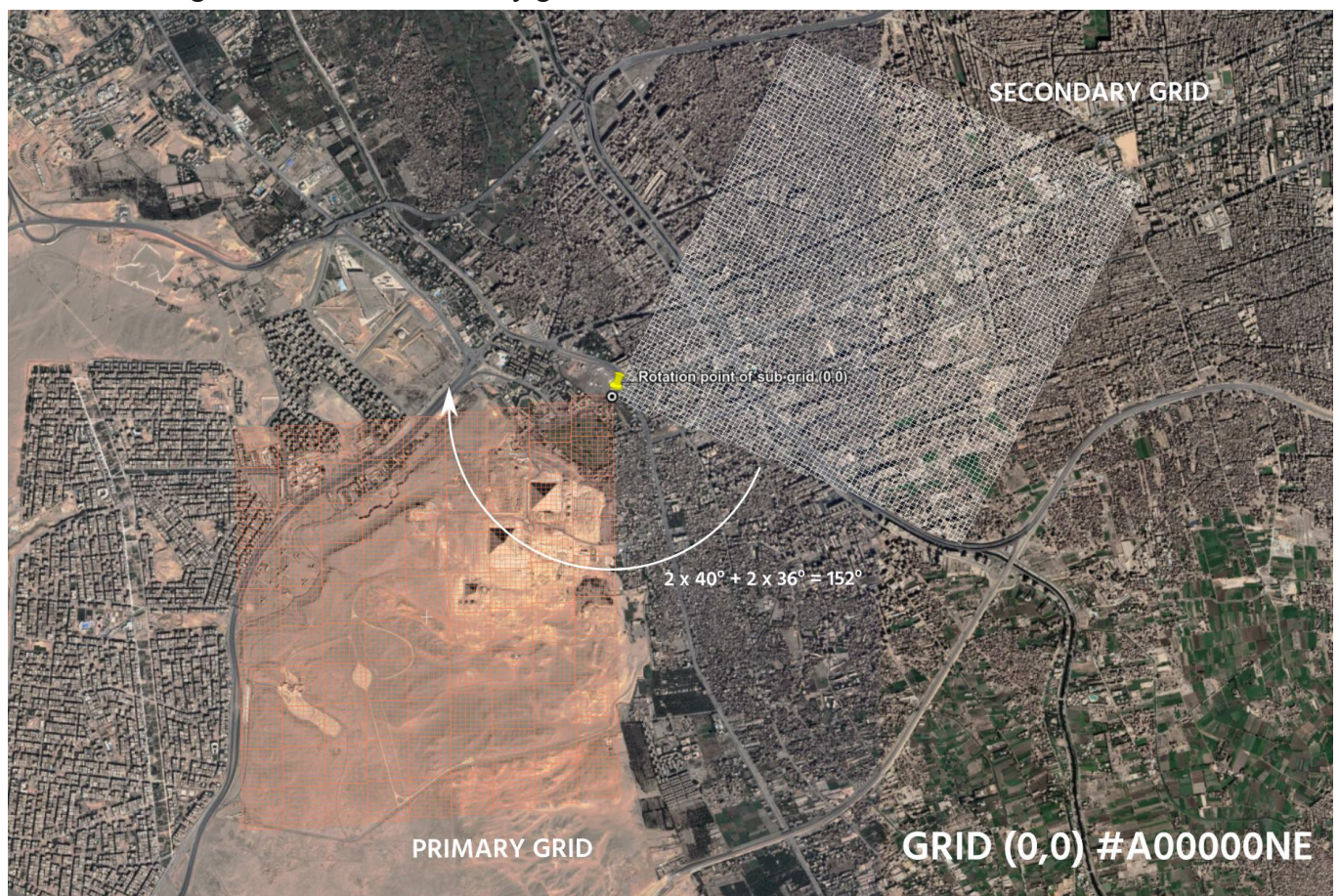


Diagram L55 - The first grid with the north east corner node selected.

The rotation sequence required to get from the north east corner node point with its rotation offsets to the N.W. corner of the Great Pyramid is shown in diagram L56, in order to clarify how the system operates.

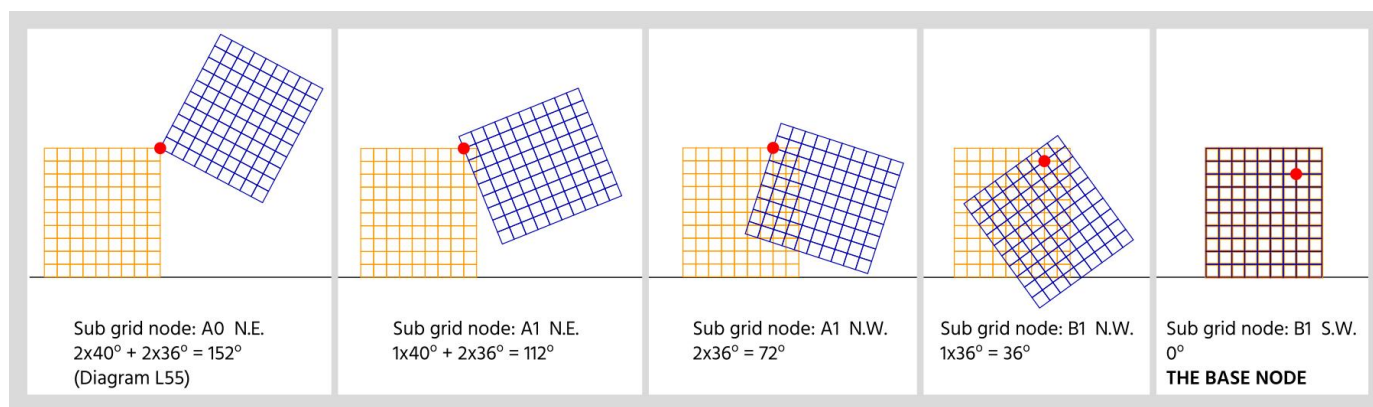


Diagram L56 - The grid rotation sequence between sub grid nodes.

Step 21

The system was then calibrated at the sidereal day point on the equator in Uganda. The longitude margin of the grid was adjusted so that the net rotation of the grid on the equator was zero degrees with the calibration being carried out to 14 decimal places of accuracy. The output of the software was programmed to display the rotation parameters in the KML file header, and at the calibration point in Uganda the following output was obtained on grid number (-1046,11542) at grid base node B187B8SW (the N.W. corner of the Great Pyramid's grid node), which is the node on which the two grids align with each other and which is the pre-programmed grid node that appears on the published webpage of the grid creation software when the page is first opened.

Grid 1 rotation gross:	-2340.0000000000005	deg
Latitude component:	-180.00854212188204	deg
Longitude component:	-2160.0674575069124	deg
Latitude grid bias:	0.034411879587436835	deg
Longitude grid bias:	0.041587749206795185	deg
Grid 1 rotation nett:	-180.0000000000002	deg
Grid 2 rotation gross:	-2.5444437451708134e-14	deg
Latitude component:	72	deg
Longitude component:	79.99999999999999	deg
Latitude grid bias:	-72	deg
Longitude grid bias:	-80	deg
Grid 2 rotation:	-2.5444437451708134e-14	deg

Step 22

The calibration adds a westerly longitudinal shift to the grid system and therefore it is impossible for the ramp and pit of the Unfinished Pyramid to still be align to the grid in the same manner as it did before. Diagram L57 shows the fully calibrated grid at Zawiyet el-Aryan and it can be seen that the longitudinal shift still aligns with the pyramid's design system. In the inset image the top of the ramp section that contains the steps now aligns with a sub grid, the ramp is still defined cleverly using the sub grid and the mini grid lines to define each side of the ramp. The red paint marks still align with the micro grid and the base of the pit still aligns with the micro grid.

The design of the Unfinished Pyramid has deliberately been formulated so that the uncalibrated and calibrated grid systems will both work within it and both the architecture of the building and the grid system itself are validated by this fact.

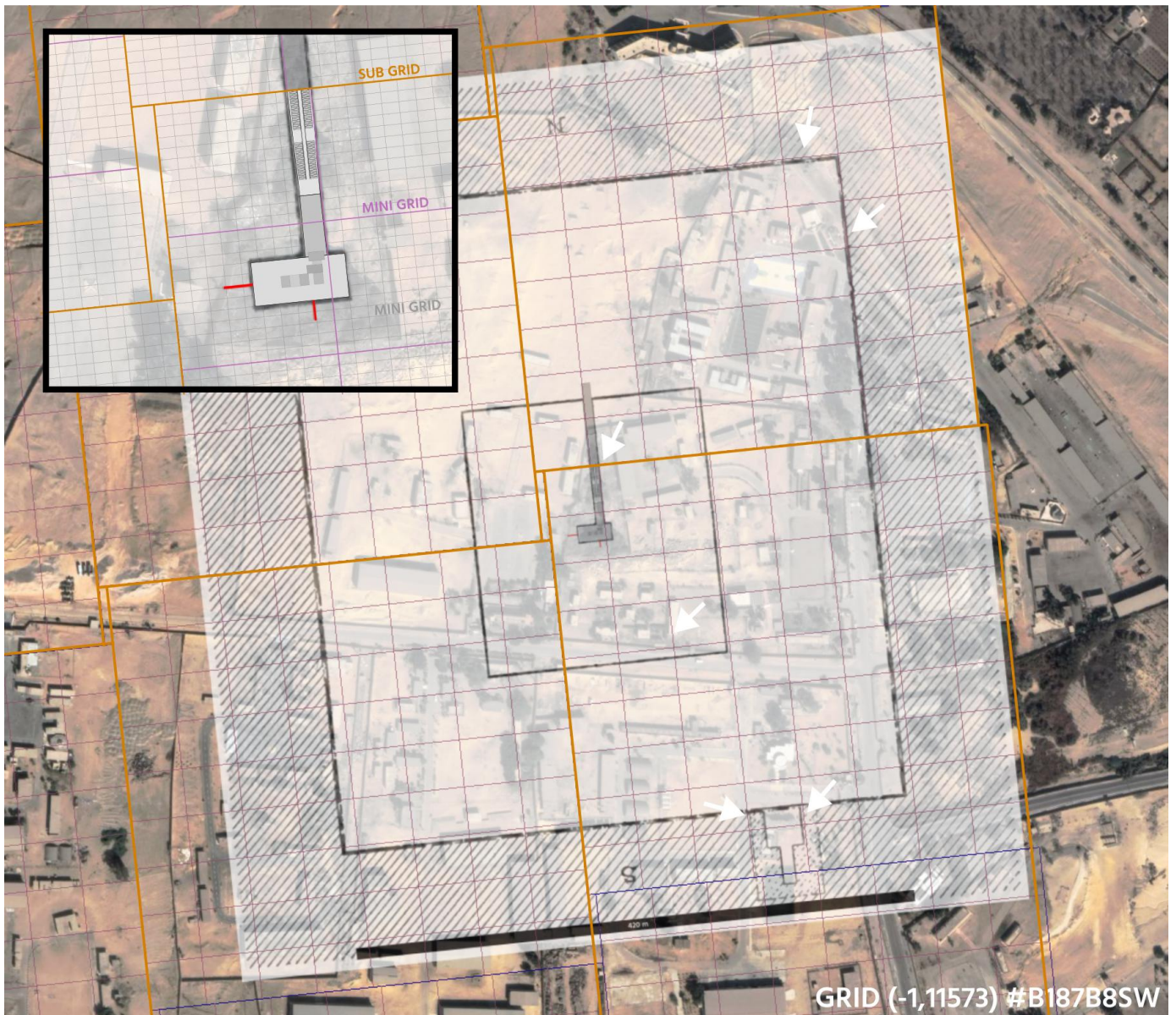


Diagram L57 - The calibrated grid position in Zawiyet el-Aryan.

Step 23

The grid can now be put to practical use because the latitude and longitude of the architectural features within the Unfinished pyramid can be read off the grid system. The single GPS measurement that was taken by the Glen Dash team at the top of the Great Pyramid from which the grid is created allows this to be done with precision on the modern WGS84 reference ellipsoid.

The oval shaped bowl structure that is set into the floor of the pit of the Unfinished pyramid is located at 29.940123° N 31.151509° E from which the horizontal component of the distance to the vertical center of the Great Pyramid can be calculated in a geodesic calculator as being 4640.3318 m.

The Earth model in the Great Pyramid is known to be at a scale of 1:87500 and therefore the distance to the point in the Unfinished pyramid when scaled up by this amount is 406029.03266 km. This distance is the maximum value of apogee of the moon - the furthest distance that the moon is located from the Earth center during its month long elliptical orbit of the planet. The Unfinished pyramid is a model of the moon in orbit around the Earth placed at the idealised apogee node of the orbit. Because the pyramid is unfinished and also because it is known that the date of the model of the Earth is the winter solstice of 2729 BCE, then implicit in the design is that there must be a finished model of the moon somewhere else that is positioned at its correct location on its orbit at the moment of the 2729 BCE winter solstice.

Step 24

The grid system still needs to be aligned to the side temple of the second Sphinx and for this to be done in a valid manner the exact scale of the second Sphinx needs to be determined.

If you look at the plan view of the Sphinx in diagram L49 you will notice that the body of the Sphinx has a number of rectangular side constructions built onto it. These side blocks are not random constructions but are the alignment system that is required to correctly scale the second Sphinx. Diagram L58 shows a close up of the second Sphinx with the sub grid and mini grid systems of grid (0,11573) shown in orange and the alignment side blocks highlighted in blue.

The principal side block on the front right shoulder area of the Sphinx is one mini grid from north to south and when it is placed into the mini grid system and correctly scaled the side block on the back left leg of the Sphinx then also aligns onto the mini grids line system. This gives the scale of the second Sphinx as exactly 6.5 : 1.

When the second Sphinx is locked into the grid in this manner the body of the Sphinx becomes perfectly aligned north south, by design, and the small statue between the Sphinx's paws is aligned to its counterpart on the actual Sphinx mean solar day prime meridian line as shown in the inset image of diagram L58.



Diagram L58 - The side blocks used for the scaling of the second Sphinx.

Step 25

The final part of the system is to align the grid to the side temple of the second Sphinx and this requires some more lateral thinking to solve. Because there are now 700,000 possible grid nodes in each main grid and because the secondary grid can rotate around the primary and easily overlap the next grid in the sequence, all of a grid's 8 neighbours can contain the pivot point, giving 5.6 million possible locations, which rules out a trial and error technique.

After using several logical locations as the pivot point both in Zawiyet and in Giza without success I considered where would be the best place to hide a pivot point from someone who had got to this stage in the puzzle solution. All of the software was programmed correctly and had an upper limitation on the longitude grid number of 11573 as that is the last grid in the sequence that overlaps the first grid on the Giza plateau and also the one which forms the Zawiyet el_Aryan pyramid. The best place to hide the pivot point would be inside the next grid in the sequence, grid number (0,11574) because it is outside the bounds of the system and will never be used and therefore highly unlikely to be ever looked at.

The pivot point for the side temple of the second Sphinx was found inside this grid and the resolution of the system's logic is perfect. Diagram L59 shows grid (0,11574), the pivot point and the alignment of the temple structure in the corner of the second grid.

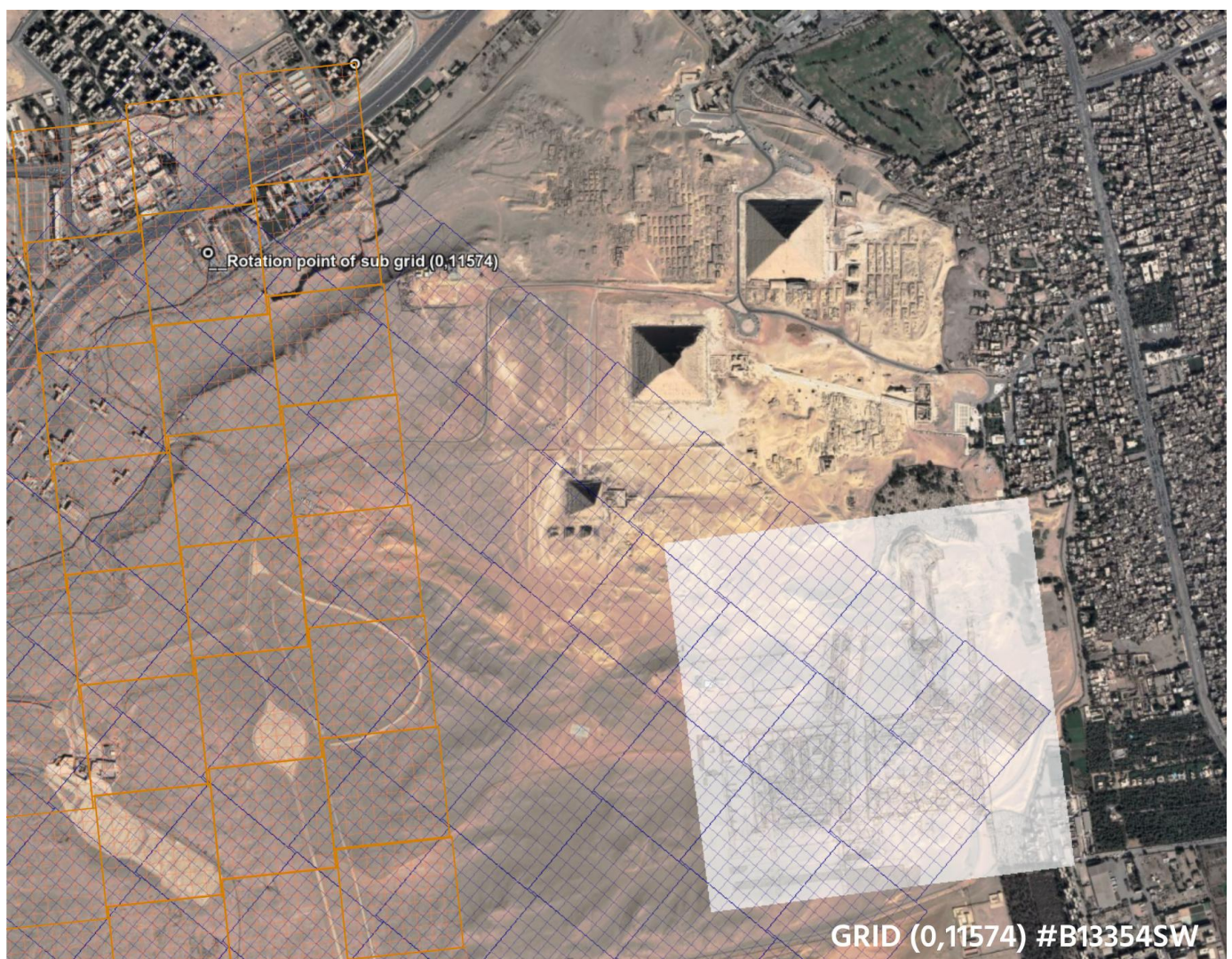


Diagram L59 - The alignment of the second Sphinx side temple.

The pivot point, or rotation point, is located in sub grid B1 of grid (0,11574) which is the same sub grid in which the Great Pyramid of Giza is located in grid (0,0). This is not coincidental. The side temple of the second Sphinx is located in the S.E. corner of the rotated secondary grid and the close ups of both these points are shown in diagram L60.



Diagram L60 - The details of the rotation point and the secondary grid alignment of the second Sphinx side temple.

The secondary grid correctly aligns with the side temple and repairs the east corner and it should be remembered that the angle of rotation of this grid is inbuilt into the grid system and therefore cannot and has not been adjusted to fit the temple. It simply does when the correct pivot point is selected.

The location of the pivot point requires further investigation because it is located at a point within the Great Pyramid if the pyramid was to be attached to sub grid B1 in the grid system as it tessellates around the world. Diagram L61 shows the Great Pyramid redrawn inside sub grid B1 of grid (0,11574) with the 1:87500 scale model of the Earth which is known to be inside the Great Pyramid superimposed on the image.

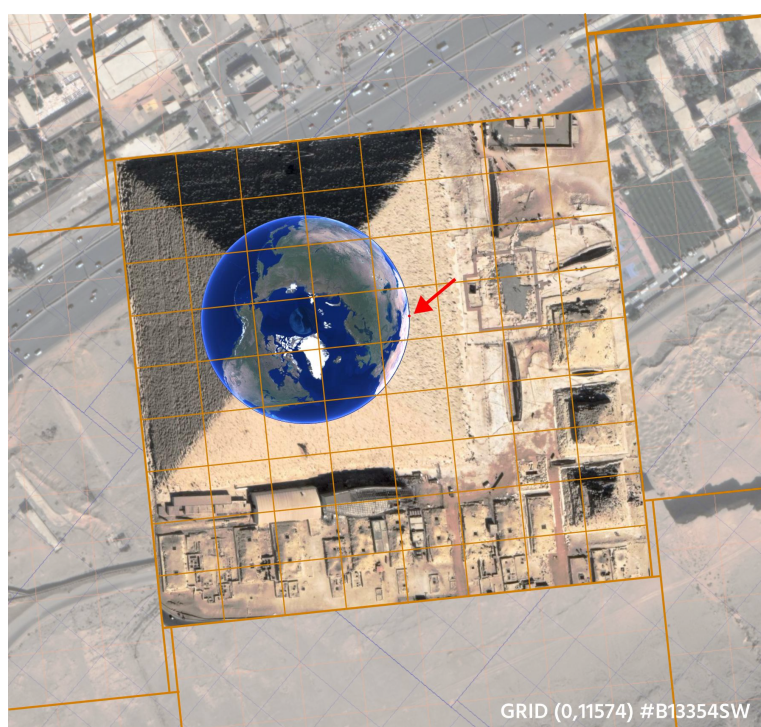


Diagram L61 - The Great Pyramid and the final pivot point location.

The pivot point, marked by the small red dot, is placed perfectly on the surface of the Earth model and at the east side of the building. The Earth model is centered on the foundation center point of the Great Pyramid.

The grid system can be seen to be complete from the alignment of this rotation point. All of the longitude margins, angular rotations of the primary and secondary grids, the angular offsets, latitude offsets and all the previous alignments used to get to this point must all be correct because the grid system self-confirms that it is correctly created. By design.

Step 26

The purpose of aligning the second Sphinx side temple from a node within grid (0,11574) is not just to conceal the alignment mechanism, it is to establish a second circuit of grids. This grid can justifiably be called grid (0,1) on a second circuit of the world and by doing so it allows the software that is forming the grid system to still function correctly. The latitude and longitude of any location on the planet can be placed into the software accompanied by the circuit number and then the rotation parameters of that grid can then be correctly evaluated by adding on 11573.4719 grids to the grid location if the grid is on the second circuit.

The software was duly amended and the coding system for the grid names was also amended so that, for example, the pivot point that was shown in diagram L61 has the circuit number added to the end of it and becomes 0#1#B13354SW-C2.

The world grid

Step 27

The reason that the architectural style of the Sphinx side temple is so different from the main Sphinx temple is that the architecture is showing that buildings of different architectural styles can be aligned to the second circuit of the grid system.

This hypothesis was tested at Angkor Wat in Cambodia, the pyramids to the north of Mexico city, the Chinese pyramids and the statues of Easter Island. All of the locations show definite association with the grid system and all but one of the locations required small adjustments to be made to the angles within the grid in order to align with the ancient structures. This suggests that there is a further level of refinement that is necessary to the grid as it tessellates continuously around the world if it is indeed the case that all of the structures are designed to align to the grid. From the lessons learned in solving the system this far, those adjustments would become apparent when continuing the linear solution that is being presented. The last known point of reference in that linear solution is the unfinished moon model and the implicit undiscovered and finished moon model, which will be the next structure that needs to be found.

During the analysis of other locations around the world, the one site that did not require any adjustments to the grid system in order to fit the local architecture was Easter Island and in particular the main line of statues located at Ahu Tongariki on the east side of the island.

Diagram L62 shows the grid system superimposed upon Easter Island.



Diagram L62 - The multiple alignments to the grid on Easter Island.

The two grid angles are, as a reminder, dictated by latitude and longitude only and in their formation a tectonic plate movement of 3.38 mm/yr north and 30.9 mm/yr east relative to the Giza movement has been applied to the grids to get the pinpoint alignments. This tectonic plate movement can be compared to our modern measurements of the current plate movement of 5.1 mm/yr north and 36.3 mm/yr east.

The angle between the first and second grids is shown by the dotted white lines in diagram L62 and it can be seen that the missing section of the volcanic crater has been cut out along this angle.

The pivot point of the second grid is in the N.W. corner of sub grid B1 (as opposed to the Great Pyramid's corner point which is in the S.W. corner of this sub grid). The orange first grid runs parallel to the cutting that forms the entrance to the Rano Raraku, shown in diagram L63, and also runs perpendicular to Ahu One Mahiki, as shown in diagram L64.

The second blue grid is aligned with Ahu Tongariki to perfection, as shown in diagram L65.

It can be stated that, beyond any reasonable doubt, the Easter Island statues at Ahu Tongariki align with the second circuit of the Giza grid and that the width of the plinth upon which they stand is formed from the gap between the sub grid corners.



Diagram L63 - Rano Raraku entrance alignment.



Diagram L64 - Ahu One Makihi alignment.



Diagram L65 - Ahu Tongariki

Summary

The world grid that is described in this paper is complete up to the point of the second circuit being added to the system. The second circuit can have any number of amendments made to it without affecting any of the buildings on the first circuit that have been shown to align perfectly to the grid in this paper.

The precision engineering of the world grid and the scientific knowledge that is contained within it explicitly proves that the buildings on the Giza plateau are the product of the highest level architectural design and cannot be the results of random building placement. The fact that at least one other significant ancient structure perfectly aligns to the grid proves that it was designed and planned with the full knowledge of its latitude and longitude relative to the prime meridian line at Giza between the paws of the Sphinx and therefore was designed within the same architectural system.

The knowledge of longitude from Giza implies precision time keeping must have been in use during the planning and construction of the Easter island statues and therefore the origins of the structures cannot be from disparate primitive societies as is currently assumed.

The system that is used to create the grid is a linear system that starts at the vertical center of the Great Pyramid, then defines the N.W. corner of that building, then defines the Giza grid which in turn defines the Sphinx location and the location of the Unfinished pyramid on the first circuit of the grid around the world. Each section of the system cannot be solved without first having solved the preceding section and therefore the next step in the logic is to find the finished model of the moon which must tie in perfectly to the grid parameters established in this paper.

Supplementary material

Grid creator

The software for creating a master grid anywhere on the world's surface is available from the URL shown below. The software is written in heavily commented javascript and the source code can therefore be accessed from the webpage and read and analysed as required.

<https://www.giza%2Dplateau.com/GridCreator.html>

Geodesic path calculator

The complex geodesic paths that are used in this paper can be recreated using the software listed below which allows multi point branched paths to be created and the output converted between winter solstice 2729 BCE coordinates and February 2018 Glen Dash survey time coordinates by way of applying the tectonic plate movement at Giza between these two moments in time. The paths used in this paper can be loaded into the software from the 'Stored geodesic systems' section of the webpage.

<https://www.giza%2Dplateau.com/PathCreator.html>

Spreadsheets

On the first tab of the spreadsheet below is a list of the 2729 BCE and 2018 latitude and longitudes of all points on the Giza plateau that are mentioned in this paper, and on the second tab the tectonic plate calculations from the hybrid date path in this paper are documented.

https://www.giza%2Dplateau.com/documents/ods/calibrate_giza_grid.ods

https://www.giza%2Dplateau.com/documents/ods/master_point_calculations.ods

GIS files in KML format

The geodesic paths, grids and relevant image overlays that are referenced in this paper are contained in the following file, which can be directly imported into Google Earth:

https://www.giza%2Dplateau.com/documents/kml/Public_KML_files.kmz

Appendix

pm	Perfect meter. One 10 millionth of the distance from the North pole to the equator on the reference ellipsoid of Earth. The conversion factor between meters and perfect meters is $1 \text{ (pm)} = 1.00019657308809 \text{ (m)}$
stk	The stack constant distance from the main chamber of the Great Pyramid, defined as $3/\sqrt{215}$ cubits.

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